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JOINT DEPARTMENT OF DEFENSE/DEPARTMENT OF
ENERGY/FEDERAL EMERGENCY MANAGEMENT AGENCY

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NUCLEAR WEAPON ACCIDENT EXERCISE

AFTER ACTION REPORT
VOLUME II

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DEFENSE NUCLEAR AGENCY
FIELD COMMAND
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SUBJECT: Joint Department of Defense/Department of Energy/Federal Emergency Management Agency Nuclear Weapon Accident Exercise 1983 (NUWAX-83)
After Action Report, Volume II

SEE DISTRIBUTION

1. Attached is Volume II of the NUWAX-83 After Action Report which supplements Volume I, Executive Quick Look.
2. In addition to the information contained in Volume I, this report contains an expanded overview, major participants' lessons learned, a chronology of events and minutes of the 27-29 September 1983 Follow-on NUWAX-83 Site Restoration Meeting.
3. This report has been cleared for public release. Additional copies of the report can be obtained through the National Technical Information Service, Springfield, Virginia.

1 Incl
as

WARREN E. AUT
Rear Admiral, USN
Commander



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VOLUME II

SECTION A

OVERVIEW

1. BACKGROUND:

a. A joint Department of Defense, Department of Energy, and Federal Emergency Management Agency Nuclear Weapon Accident Exercise, NUWAX-83, was conducted during the period 5-10 May 1983 by the Defense Nuclear Agency. The exercise included the United States Navy, the Department of Energy, the Federal Emergency Management Agency, and the Commonwealth of Virginia (COV) as the major participating players. NUWAX-83 was the third such full-scale exercise of the nation's nuclear weapon accident response capabilities and was conducted at the Department of Energy's Nevada Test Site (NTS). The scenario had artificialities specifically incorporated to provide maximum play for the widest possible variety of participants. In actual nuclear weapon transport, the United States employs stringent safety requirements in order to prevent aircraft accidents, such as portrayed in the NUWAX-83 scenario. For instance, flight over populated areas is specifically avoided, or at least minimized, when otherwise impossible to avoid. In a similar vein, the U.S. has never had a fire or high explosive component explosion involving a nuclear weapon and a helicopter.

b. Since the development of nuclear weapons by the United States, there has never been an unplanned or inadvertent detonation of a weapon which resulted in a nuclear yield. The United States has, however, experienced accidents which resulted in detonation of the high explosive components of the weapons and created significant radiological problems for response forces

lved in the cleanup. Two notable accidents occurred in Palomares, Spain in 1966 and Thule, Greenland in 1968. Both of these accidents resulted in detonation of the high explosive components of some of the weapons involved as well as area radiological contamination. These accidents provided extensive experience in procedures and techniques for recovering from an actual nuclear weapon accident. However, much of the experience gained was gradually lost due to the loss of personnel who had participated in the recovery efforts. Currently, in order to handle such accidents, each Military Service and the DOE maintain response teams which are capable of dealing with the various aspects of a nuclear weapon mishap. Prior to NUWAXs -79 and -81, however, there was little opportunity to exercise or evaluate the interfaces among these teams and management elements in the joint operations environment or to evaluate response guidance. Both exercises identified many shortfalls and limiting factors in the national response capability and generated some significant changes in the concept of nuclear weapon accident preparedness and response. NUWAX-83 provided a realistic medium for evaluation of these new concepts and for the further enhancement of the national radiological response capability.

c. NUWAX-79 was the first large-scale nuclear weapon accident exercise conducted by the U.S. It was a time compressed exercise of limited scope. It did, however, involve the DOE and all four Services in order to increase accident response awareness throughout the DOD. Play in the Washington area was minimal, as were off-site communications, and interfaces with other Federal departments and agencies which might have direct or supporting responsibilities. The U.S. Army provided the Initial Response Force and the U.S. Air Force provided the Service Response Force. No attempt was made to

include state or local authorities. This limited approach to improvement of the national nuclear weapon accident response capabilities reflected existing perceptions of current capabilities and what was initially achievable.

d. Considered within the context of its scope and intent, NUWAX-79 was a very successful exercise, since no comparable exercise of its magnitude had ever been attempted in the United States, and no actual nuclear weapon accident had occurred for over 11 years. The true significance of NUWAX-79 was the clear highlighting of what had to be done to regain the capabilities that had previously existed and expand them to meet more demanding conditions. The exercise planning process alone made it obvious that a nuclear weapon accident will create unique radiological health hazards, public concerns and clean-up problems far different from other military or natural accidents that might involve military response. During the field exercise proper it became clear that effective management of the response efforts required uniquely knowledgeable and well trained military commanders and staffs to meet the specialized, multifaceted technical and operational challenges. Furthermore, exercise experience confirmed that the capabilities and support available from or provided by DOE participants were neither widely understood nor well defined in DOD Service directives. Consequently, DOE capabilities were poorly integrated and less than efficiently utilized, and DOE responsibilities were not initially recognized by the DOD on-scene commanders.

e. Following NUWAX-79, many improvements were made. Intra-DOD and interagency agreements, directives and procedures were developed or refined. The roles and responsibilities of FEMA were integrated into DOD and DOE

planning. A draft Nuclear Weapon Accident Response Procedures (NARP) Manual was prepared as a guidance document for field use by the DOD and other accident response forces. Training programs were revised at the Interservice Nuclear Weapons School, and a new Senior Officer's Course was initiated. Steps were taken to involve state and local governments in nuclear weapon response activities and exercises. In September 1980, a TITAN accident (Damascus, Arkansas), which involved a nuclear weapon, but not radioactive dispersion, stimulated further DOD improvements.

f. NUWAX-81 built upon and expanded evaluation of the advances made since NUWAX-79. Major goals included involvement of Federal, civil and military headquarters and their field response activities. Further, NUWAX-81 was intended to involve a state emergency response organization and, as practicable, to simulate local government and civilians in the accident environment. The State of California was a major planner and participant in this exercise. The value of using a live radioactive contaminant for realism and the lack of an alternative area with a suitable Environmental Impact Statement (EIS) dictated a return to the Nevada Test Site. In NUWAX-81 the U.S. Air Force provided the Initial Response Force (IRF), and the U.S. Army provided the Service Response Force (SRF). This expanded the exercise of both Services and permitted an evaluation of the role played by Army's Director of Military Support (DOMS), who is responsible for coordinating the off-site DOD support to the Civil Sector through FEMA, should the President declare a major disaster or emergency following a nuclear weapon accident. NUWAX-81 allowed previously developed improvements to be verified and expanded awareness in the

Federal and state governments about the need to develop and practice nuclear weapon accident response. The need for jointly ratified response agreements between various entities which would respond to an accident of this type was demonstrated. In general, the overall national nuclear weapon accident response capability was successfully exercised and evaluated.

2. OBJECTIVES OF NUWAX-83:

a. The major objectives of NUWAX-83 were as follows:

(1) To build upon and logically extend the experience of previous exercises and provide for the continued growth of the various Federal response capabilities.

(2) To expand the level of participation within the Federal government, state government (through play by the Commonwealth of Virginia), and local communities.

(3) To exercise the U.S. Navy in a primary response role.

b. Functional areas were designated to facilitate the evaluation and analysis of the exercise activities. These areas were as follows:

- (1) Command and Control
- (2) Radiological Safety and Control
- (3) Communications
- (4) Security
- (5) Casualty Handling/Medical Operations
- (6) Weapon Operations
- (7) Public Affairs
- (8) Logistics and Service Support

(9) Legal Affairs

(10) Site Restoration

c. Exercise performance objectives were developed as an expanded guide in the evaluation of player activities in each major functional area of accident response. These performance objectives are defined in the following paragraphs.

d. Command and Control.

(1) Command Relationships. Exercise and evaluate control and coordination procedures employed by DOD, DOE, FEMA, and the Commonwealth of Virginia in responding to a nuclear weapon accident which extends beyond the specific limits of normal military authority and requires extensive interface with other Federal agencies, major command agencies of the Department of Defense, and Commonwealth of Virginia state, county, and local governments.

(2) Service/Agency Relationships. Exercise and evaluate procedures for utilizing and integrating technical capabilities and expertise of responding forces in overall response operations.

(3) Operating Procedures. Exercise and evaluate general operating procedures including notification and mobilization of response forces, timeliness of response, and follow-on actions during exercise play.

e. Radiological Safety and Control.

(1) Radiological Health. Exercise and evaluate the radiological health procedures and capabilities of the medical and radiological health teams supporting the on-scene commander and state/local government. Evaluate the interface with radiological response elements from county and state.

offices and Federal agencies such as the Environmental Protection Agency, the Department of Health and Human Services, and the Department of Agriculture.

(2) Radiological Control. Exercise and evaluate the capabilities and actions of radiation survey teams to determine and coordinate on the location and extent of contamination in the accident area using initial entry survey techniques as well as detailed area survey and plotting techniques. Exercise and evaluate the utilization of the Accident Response Group Aerial Measuring System (AMS), Atmospheric Release Advisory Capability (ARAC), and field measurement data.

(3) Decontamination. Exercise and evaluate the capability of Service/Agency run hot lines to perform decontamination operations.

f. Communications.

(1) Joint Reporting System (JRS). Exercise and evaluate the capability through the JRS to provide timely and accurate accident notification and information to the NMCC, appropriate Service Headquarters, the JNACC, DOE/EOC, FEMA, other Federal agencies at the national level, and to state and local authorities, as appropriate.

(2) Response Force Communications. Exercise and evaluate the communications equipment with, or deployed to support, nuclear accident response forces at the accident site.

g. Security.

(1) DOD Authority. Exercise and evaluate existing guidance and authority to establish DOD control over an accident site at a location where DOD authority and jurisdiction may be challenged by civil authorities.

(2) Security Procedures. Exercise and evaluate the capabilities and security procedures employed by the initial and follow-on response forces to establish and maintain control over the accident site. Exercise and evaluate their interface with civil law enforcement on appropriate security matters.

(3) Operations and Communications Security. Exercise and evaluate the capabilities to protect classified material through operations security (OPSEC) and communications security (COMSEC) procedures.

h. Casualty Handling/Medical Operations.

(1) Casualty Handling. Exercise and evaluate casualty handling procedures, coordination, and liaison with local hospitals on the medical aspects of radiation hazards.

(2) Casualty Reporting. Exercise and evaluate response force procedures for casualty reporting.

i. Weapons Operations.

(1) Render Safe Procedures. Exercise and evaluate the capabilities and procedures of the EOD personnel in rendering safe simulated damaged nuclear weapons and in disposing of simulated high explosive hazards.

(2) DOE Support. Exercise and evaluate the effective utilization of appropriate laboratory weapon specialists of the DOE Accident Response Group (ARG) in an advisory and assistance role.

(3) Recovery and Salvage. Exercise and evaluate the capability of participating DOD elements, with assistance from DOE, to recover, package, and prepare weapons and weapon components for shipment.

j. Public Affairs. Exercise and evaluate the public affairs procedures

of all elements of the DOD, DOE, FEMA, the coordination among these elements, and their interface with state and county public affairs representatives. Evaluate the adequacy of existing DOD public affairs policy for accidents involving nuclear weapons. Evaluate the Public Affairs program to satisfy concerns and pressures related to the public interest.

k. Logistics and Service Support for Response Operations.

(1) Administration. Exercise and evaluate the administrative support to the on-scene commander.

(2) Transportation. Exercise and evaluate DOD airlift support and surface transportation capabilities.

(3) Logistic Support. Exercise and evaluate logistic support.

l. Legal Affairs.

(1) Support and Advice. Exercise and evaluate the legal program to include the effectiveness of support and advice to the on-scene commander.

(2) Jurisdictional Disputes. Evaluate capability to resolve any jurisdictional disputes between responding forces and the state and county governments.

m. Site Restoration.

(1) Decontamination. Exercise and evaluate the capabilities of the military and civilian response forces to plan for extended decontamination actions.

(2) Site Restoration Planning. Exercise and evaluate the detailed site restoration planning by response elements to include identification of equipment, transportation, personnel assets, cost estimates, procurement procedures, time requirements, and established cleanup standards.

3. EXERCISE PLANNING:

a. Joint planning for NUWAX-83 commenced with the first meeting of the Exercise Operations and Evaluation Working Group (EOEWG) held at FCDNA 29 April 1982. Planning responsibilities were assigned to four sub-groups, the Scenario Working Group (SWG), the Radiological Safety Working Group (RSWG), the Logistics Support Group (LSG), and the Financial Planning Group (FPG). These groups were composed of representatives from DOD, DOE, FEMA, and COV. Planning actions accomplished by the sub-groups were periodically briefed to the EOEWG for review and approval.

b. Two major planning documents were published by Field Command, Defense Nuclear Agency for use by exercise controllers and players. The NUWAX-83 Exercise Plan (EXPLAN) provided detailed information for the planning, preparation, execution, and analysis of the exercise. The NUWAX-83 Player Supplement to the EXPLAN provided the player response forces necessary information about the exercise to help minimize confusion over exercise artificialities and satisfy real world safety concerns.

4. EXERCISE SCENARIO:

a. Basic Staging:

(1) A Navy CH-46 Sea Knight helicopter located at the (simulated) Naval Ordnance Facility (NOF), Port Gaston, VA, was loaded with three nuclear weapons for a logistical movement to a nearby naval station. The CH-46 helicopter was escorted by a second CH-46 containing a security reaction force of 15 marines. About 5 kilometers beyond the boundary of the NOF, the security force helicopter encountered difficulty and was required to make an

immediate forced landing. The load-carrying helicopter then attempted to return to NOF Port Gaston, the nearest DOD facility. Over the (simulated) town of Port Caston, VA, and just before crossing the NOF boundary on his return to the RED LABEL area, the pilot of the logistical helicopter issued an abrupt "MAY DAY." Immediately thereafter, one rotor of the logistical helicopter came loose and cut into the fuselage. The helicopter then separated into two sections and crashed; the front portion of the helicopter and some debris landed approximately 50 meters from the gate inside of the NOF fence with debris catching on fire, while the smaller rear section hit near the city park and was, likewise, on fire. Some type of cargo had fallen from the separating helicopter hitting the ground near the fence line and exploding. One of the fence maintenance personnel working in the area was killed by flying debris. In addition, one civilian Navy employee and sailor were injured. Marine guard(s) at the gate were injured and a sailor and his girlfriend in the park were hurt by the flying debris. Two residents of the trailer park were killed by debris from the crash. Four other residents had minor injuries and walked to the outskirts of the trailer park to observe the fire. A group of bystanders quickly began gathering outside the perimeter fence and observed the activity.

(2) Civilians from Port Gaston witnessed the crash and explosion and notified Port Gaston and Jefferson County police, fire, and rescue units. Both Naval Ordnance Facility and Jefferson County police, fire, and rescue units responded. The Marine security force on the escort ship was unable to respond immediately, but arrived shortly thereafter.

b. Pre-Crash Aircraft Configuration:

(a) Mission Aircraft #1. CH-46 Sea Knight. Crew consisted of:

Crew:

Pilot	Courier
Co-Pilot	Armed Guard
Crew Chief	Armed Guard

Cargo:

Weapon-A stored in container.

Weapons-B & C on a double high stack bolster.

(b) Escort Aircraft. CH-46 Sea Knight. Crew consisted of:

Crew:

Pilot	Crew Chief
Co-Pilot	15-person Security Force

c. Crash Damage to Cargo:

(1) A W-55 SUBROC fell with the front portion of the wreckage and remained inside the helicopter wreckage.

(2) A B-57 bomb fell from the front portion of the helicopter and underwent a high order high explosive detonation upon impact. This resulted in destruction of the weapon, the spread of classified contaminated debris, and produced an area of downwind radioactive contamination.

(3) Another B-57 bomb fell with the first one and was separated from it by the explosion. The physics package of the second B-57 was thrown off military property while the parachute section remained inside the NOF boundary.

d. Casualties: None of the logistical helicopter crew survived the crash. Three fence maintenance personnel were inspecting the fence line, and one of these individuals was killed by flying debris. Two civilians in the trailer park were killed. Several civilians in Port Gaston were injured by the explosion's debris. Several other civilians from the community received external contamination from the radioactive plume in addition to their injuries.

e. Radioactive Fallout Pattern: Area contamination produced by the B-57 bomb undergoing high explosive detonation included the seafood restaurant, part of a nearby mobile home park, and a small industrial park.

f. Civilian Involvement: Following the crash and explosion, local citizens called the Jefferson County and Port Gaston Police departments and local fire and rescue units. Rescue units responded to the accident site. Contamination resulting from the accident was spread by the unsuspecting populace. Local resources were heavily taxed in dealing with the contamination and restoration.

5. EXERCISE OPERATIONS:

a. NUWAX-83 was an exercise that maximized effects of an on-base nuclear weapon accident with severe off-base consequences. Challenging accident recovery problems were provided to the Federal, state, and local response personnel. A Joint Task Group (JTG), composed of approximately 300 personnel, furnished exercise control, evaluation, and support both at the MTS and at Emergency Operations Centers in the Washington Area. JTG umpires functioned as both exercise controllers and evaluators at the accident site and in the Washington Area.

b. Some 600 player participants representing the DOD, DOE, FEMA, other Federal agencies, and the Commonwealth of Virginia (COV) responded to the accident. The Port Gaston NOF and the town of Port Gaston were constructed prior to the exercise and were populated for several days before STARTEX. NUWAX-83 differed from previous NUWAX exercises in that the scenario was based on an accident at an established town area. During the exercise, the NOF and accident site were under the operational control of the on-scene commander, and the town was governed by the local authorities.

c. There were in excess of 150 official visitors and 30 media personnel who observed NUWAX-83 operations. In addition, there were 71 official observers, including foreign observers from the United Kingdom, who attended the exercise for periods ranging from three to seven days.

d. In Washington, surrogates played in the place of most key decision makers. The surrogates' actions and comments during the exercise may not necessarily have depicted the actions and comments their respective principals might have injected into exercise play. Since the Washington Control Group also simulated a number of external exercise interfaces, the players were, in many instances, unable to coordinate with their normal points of contact as they would in an actual situation.

e. Washington area commands and agencies which participated in Exercise NUWAX-83 were the:

(1) Department of Defense

(a) Assistant Secretary of Defense (Public Affairs)

(b) Assistant to the Secretary of Defense (Atomic Energy)

- (c) Organization of the Joint Chiefs of Staff
- (d) Department of the Army
- (e) Department of the Navy (to include CINCLANTFLT HQ, Norfolk, VA)
- (f) Department of the Air Force
- (g) Defense Nuclear Agency
- (2) Department of Energy
- (3) Federal Emergency Management Agency
- (4) Department of Health and Human Services
Public Health Service
- (5) Environmental Protection Agency
- (6) Department of Agriculture
- (7) Department of Interior
- (8) Department of Housing and Urban Development
- (9) Department of Commerce
- (10) National Communications System.
- (11) National Red Cross.

6. LESSONS LEARNED AND RECOMMENDATIONS:

a. Details of the major lessons learned from NUWAX-83 and recommendations for corrective action to improve accident response are included in Section B. They are based on direct umpire/controller observations and were also summarized for key players/planners at an exercise critique held 12-13 May 1983 at the DOE's Nevada Operations Office. The lessons learned are considered the official conclusions from NUWAX-83 in that they reflect the consensus of the major participating agencies. In addition, each major participant's lessons learned are included as a separate

annex in order to provide for comparison and divergent viewpoints.

7. SUMMARY OF NUWAX-83:

a. Overall, NUWAX-83 must be considered a great success. The objectives of the exercise were achieved and new lessons were learned. Previously developed improvements were verified and the need for further development of response capabilities was recognized by the Federal and state agencies involved. It was obvious that the NUWAX series of exercises has greatly improved the experience and knowledge level of virtually all the response agencies that deal with this type of problem.

b. There was unanimous support from both planners and players for continuing the NUWAX exercise series. NUWAX-83 reaffirmed that only through jointly conducted field exercises can the degree of realism be achieved that allows for a critical exercise test and evaluation of current nuclear weapon accident response procedures and doctrine. Comparison of NUWAX-83 deficiencies and lessons learned with those of earlier exercises clearly illustrates major improvements and understanding of the inherent problems in a nuclear weapon accident by the response community.

c. NUWAX-83 was a learning experience of great benefit to the response community. It was conducted in a no-fault environment and thus has permitted a complete and very candid evaluation in this After Action Report. There is no intention to single out individuals or groups for criticism; the objective is to improve response planning and procedures. In fact, individual and group performance should be highly commended. The leadership demonstrated in the response clearly reflected extreme dedication, sense of purpose, and continued improvement in virtually every area.

8. SIGNIFICANT CONCLUSIONS FROM LESSONS LEARNED AT NUWAX-83: Progress in improvement to the national capability to respond to a nuclear weapon accident has been extensive over the past four years. NUWAX-83, itself a significant advance in scope, provided a number of important lessons. From these latest lessons, there appear to be several specific areas which offer the greatest opportunity to further enhance our response capability. These include:

a. Radiological Guidelines: The absence of coordinated radiological procedures which would rapidly identify and quantify the radiological problem remains an area of weakness. While there are adequate resources and expertise available for response, there is no coordinated plan to define the existing problem. The public information and relations programs are hampered by a lack of consensus on health physics, and there are no coordinated Federal site restoration guidelines for use in discussion with state or local government officials. It is not hard to forecast the challenges facing the total Federal response force under the existing conditions. Some examples are:

(1) The need to avoid undue public alarm during all phases of accident response,

(2) The need to assure contaminated civilians that they have been properly decontaminated,

(3) The need to achieve agreement with state and local agencies that buildings, land, etc., have been cleaned up to a level of safety that has broad support among the scientific community. In the absence of some agreed criteria, the economic impact and legal aspects could be overwhelming.

The Government's credibility will be challenged without a clearly established course of action which defines the actual problem. The most significant radiation exposure normally occurs during the passage of the contaminated cloud immediately following the accident, and before protective or preventive measures can be implemented. The degree of hazard to people in the contaminated area after cloud passage is not precisely determinable. However, it is much smaller than the hazard during cloud passage. Extensive, but as yet uncompleted, work to develop coordinated guidelines for clean up standards has been conducted. The difficulty in predicting radiological effects in a plan which attempts to cover all accident conditions may make creation of such a plan impossible. For this reason, the first effort should be slanted toward formulating guidelines.

Information on the hazard, based on exposure time, to unprotected personnel should be generated. This information should be compiled and used as a guide to minimize public and response force risk.

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b. Federal, State and Local Planning; NUWAX-83 incorporated state and local authority participation in a major nuclear weapon accident exercise. NUWAX-83 experience reaffirmed the necessity for emergency pre-planning and coordination between DOD nuclear facility commanders and civil authorities. Prompt, effective, coordinated reaction will depend on the degree of pre-planning and mutual knowledge of responsibilities and capabilities established prior to an accident. The complexities of the response required, the initial confusion resulting from inadequate information flow, the hazards

to life and the threat of radioactive contamination all demand coordinated pre-planning. Since NUWAX-79, DOD, FEMA and DOE have been striving to improve coordination with state and local authorities. DOD has directed that the Services cooperate with and assist FEMA in developing radiological emergency plans with appropriate state and local authorities for those DOD fixed facilities where the potential exists for an accident involving radioactive material. Local military installation commanders must plan to coordinate or interface with state and local officials during their radiological accident exercises within the limits permitted by security classification guidelines and the ability of the local governmental agencies to participate. The basic DOD policy of "neither-confirming-nor-denying" the presence of nuclear weapons under normal day-to-day conditions somewhat constrains accident pre-planning and joint military/civilian exercises. Nevertheless, there is a need for some form of military-civil government interface to take place. Actions are in progress to resolve the dichotomy between security requirements and the need to enhance nuclear weapon accident coordination. It is imperative that military installation commanders be provided clear guidance and assistance that will enable them to plan effectively with their civilian counterparts.

→ c. Expansion of Training Opportunities. Ever since the preparatory planning for NUWAX-79, numerous recommendations for revisions of regulations and operating procedures have been made. The efforts toward refinement and improvement have resulted in several revised editions of the draft NARP, new formal courses of instruction, and many revisions of DOD operating procedures. Lessons learned from major exercises have been briefed widely. It is

extremely important that the response agencies at the Federal, state, and local levels train to the standards and with the equipment which have been identified as necessary. Retirement and transfers continue to drain the cadre of experienced personnel. Since the probability of having an accident has been lowered in the 1970's and 80's, it is understandable that even those individuals who are tasked by their Services to respond to an accident have tended in the past to downplay this responsibility and focus on the many day-to-day problems facing them. However, NUWAX-83 has clearly indicated that response forces currently recognize the magnitude of their responsibility and have made significant advances in almost every area. This level of training must be maintained and expanded to enable the critical mission of nuclear weapon accident response preparedness to be fulfilled.

VOLUME II

SECTION B

LESSONS LEARNED

1. COMMAND AND CONTROL: (Washington Play):

a. TOPIC. Notification (National Military Command Center (NMCC)).

(1) COMMENT/DISCUSSION: The NMCC received the initial BROKEN ARROW report (voice) from a Commander in Chief, Atlantic Fleet (CINCLANTFLT) Public Affairs Officer (PAO) at 051611Z May 1983. This notification used the flag words BROKEN ARROW and revealed only that a helicopter had crashed at the Naval Ordnance Facility (NOF), Port Gaston, VA. A post-exercise reconstruction of this event indicates that the Service Response Force (SRF) PAO had called the CINCLANTFLT PAO and requested him to inform the Office of the Secretary of Defense (OSD) and Navy Public Affairs Offices of the helicopter accident. The CINCLANTFLT PAO inadvertently reached the NMCC and subsequently gave his report to all participants in the telephone conference convened by the NMCC. This report created initial confusion in the NMCC, partly as a result of a poor telephone connection. Additionally, it did not contain the elements of information required in a BROKEN ARROW report. The NMCC had significant difficulty in understanding the report, who was sending the report, and who to contact to obtain additional information regarding casualties, damage, weapon types, location of the crash, etc.

(2) CONCLUSION: The initial BROKEN ARROW report received by the NMCC did not contain sufficient information and did not come through the normal operations channel. There is no record indicating that a proper OPREP-3 BROKEN ARROW voice report was submitted by on-site or CINCLANTFLT operations personnel in accordance with JCS Pub 6.

(3) RECOMMENDATION: That the Navy should review OPREP-3 reporting procedures and emphasize the importance of correct, complete BROKEN ARROW reporting.

b. TOPIC. Notification Procedures (DOE EOC).

(1) COMMENT/DISCUSSION: Review of the Department of Energy (DOE) notification process indicates:

(a) The initial NMCC conference call with CINCLANTFLT did not include a specific location and the types of weapons involved.

(b) DOE first received the accident details from the DOE JNACC and then contacted the NMCC in a secure mode for coordination.

(c) The NMCC did not retransmit the BROKEN ARROW report to DOE and FEMA for over 2.5 hours.

(2) CONCLUSION: The DOE did not receive adequate information from DOD elements during the initial hours following the accident notification. Reporting instructions should include HQs DOE/EOC and FEMA EICC as timely readdressees on all BROKEN ARROW record copy reports.

(3) RECOMMENDATION: That the ATSD(AE) stress the importance of timely, accurate reporting, and verify that DOE and FEMA are included as readdressees on all pertinent nuclear weapon accident reports.

c. TOPIC. Notification Procedures (FEMA Emergency Information Coordination Center (EICC)).

(1) COMMENT/DISCUSSION: The information provided by the reporting command in the initial NMCC BROKEN ARROW conference call was sufficient to alert the FEMA EICC, but insufficient to cause FEMA to notify those agencies and offices within the Federal Government which have response requirements. Information regarding radiation contamination was unknown for an extended period. When FEMA notifications did begin, the process took over one hour to complete.

(2) CONCLUSION: Federal agencies can not act decisively on incomplete information. Reporting organizations must ensure that complete and accurate information is provided as rapidly as possible.

(3) RECOMMENDATION: That reporting Services/Agencies ensure they obtain complete information as soon as possible, notify all appropriate agencies, and provide information updates as often as necessary.

d. TOPIC. Transfer of National-Level Command and Control (NMCC).

(1) COMMENT/DISCUSSION:

(a) The Department of Defense, Department of Energy, and Federal Emergency Management Agency concluded the Joint Agreement for response to nuclear weapons accidents in January 1981. This agreement contains the following provisions: "The NMCC will be responsible for initial national-level command and control and response of Department of Defense (DOD) resources and personnel until conditions have stabilized, at which time command and control will be transferred to the Responsible Service operations center." This agreement has been incorporated into the 10 March 1981 DOD Instruction 5100.52, "Radiological Assistance in the Event of an Accident Involving Radioactive Materials."

(b) During NUWAX-83, the transfer of national-level command and control of the accident from the NMCC to the Navy Command Center (NCC) occurred at 051858Z May 1983. The turnover in control occurred as a result of the Navy having elements in close proximity to the crash site and good communications with the on-scene commander (OSC). Additionally, the NCC indicated a desire to assume command of the situation, although conditions at the accident site were still not completely clear. For example, some information indicated that one weapon remained unaccounted for.

(2) CONCLUSION: The NMCC transferred command and control of the accident to the NCC smoothly and efficiently. However, the stabilization criteria providing for transition of operational control in the Washington area during a nuclear weapon accident response operation were not clearly defined.

(3) RECOMMENDATION: That the Assistant to the Secretary of Defense (Atomic Energy) (ATSD(AE)), in coordination with the Services and the Organization of the Joint Chiefs of Staff (OJCS), review criteria for the transfer of national-level command and control of nuclear weapon accident response operations and take corrective action as required.

e. TOPIC. National-level Command and Control (Navy Command Center (NCC)).

(1) COMMENT/DISCUSSION:

(a) The NMCC is responsible for initial national-level command and control and response of DOD resources and personnel. When conditions have stabilized and as directed by the Secretary of Defense or his authorized representative, the NMCC will transfer command and control to the responsible Service operations center.

(b) The NMCC transferred command and control responsibility to the NCC at 051858Z, approximately 3 hours after the accident. The NCC Crisis Team (CT) Director had indicated a readiness to accept control. At this point, the NCC had assessed and assimilated all information which the NMCC had acquired regarding the accident. Although many details concerning the accident, such as location of nuclear weapons, were not known even at the site, the NCC had communications links with the NOF Port Gaston, where the crash occurred.

(c) When the NCC assumed control, information in the NMCC and NCC revealed that the Navy Regional Response Force (RRF) was providing emergency services and had established a National Defense Area (NDA), that the Service Response Force (SRF) was enroute, and that special teams were requested.

(d) The NCC approach for accomplishing national-level control during the initial phases was to monitor on-scene activity and to query the OSC only after all other sources for required information were exhausted. Generally, the NCC CT would communicate with the OSC only after assessing the likelihood that the requested data was available to the OSC and the requirement for the information was sufficiently urgent to warrant the query. To assess urgency, the CT evaluated the utility of the information and the consequences of not having it.

(e) The relatively low level of NCC communications to the OSC could be attributed, upon analysis, to two principal factors; the first was exercise artificiality, and the second was insufficiently defined procedural

responsibilities. The subsequent paragraphs address each of these factors in turn.

(f) With regard to exercise artificialities, two points are germane. First, the PREMIER TASK VI exercise prepared Washington-area participants for NUWAX-83. Several key members of the NUWAX-83 NCC CT participated in Exercise PREMIER TASK VI. The second point is that the level of active participation by other Washington-area organizations was not at a sufficiently high level of authority to induce the sense of urgency which normally accompanies those organizational interactions. For example, FEMA, DOE, and DNA were represented at briefings in the NCC by the individuals of those organizations assigned as representatives to the CT. While the participation of those representatives substantially enhanced coordination among their respective organizations, their presence at briefings did not generate the dialogue or incisive questions normally asked by senior officials. Questions asked by senior officials frequently drive requests for additional information.

(g) The second major point focuses on the assignment of specific procedural responsibilities associated with national-level command and control of a nuclear weapon accident response. The Navy CT, having a response plan in place, forces at the accident site, and communications with the OSC, essentially had established command and control. However, directives pertaining to transfer of national level command and control do not address specific functions and procedures, normally accomplished by the NMCC, which the Service should assume at the time of transfer.

(2) CONCLUSION:

(a) Participation by senior officials of Washington-area response organizations was inadequate to stimulate exercise play.

(b) The Navy approach to national-level command and control resulted in a level of dialogue between the NCC and the accident site well below that expected by exercise planners. Exercise artificialities and the lack of assigned procedural responsibilities for the responsible Service also contributed to the low level of dialogue. Although keeping queries to the OSC to a minimum is good procedure, it is doubted that the NCC will always be able to "run interference" during an actual accident if, in fact, senior officials in Washington wish to address their questions specifically to the OSC.

(3) RECOMMENDATIONS:

(a) That the ATSD(AE), in coordination with the Services and OJCS, review and specify the functional responsibilities of the responsible Service upon assumption of national-level control coordination.

(b) That the Defense Nuclear Agency encourage participation by senior officials of Washington-area response organizations in future NUWAX exercises.

f. TOPIC. NMCC Play Subsequent to Transfer of National-Level Command and Control (NMCC).

(1) COMMENT/DISCUSSION: Transfer of national-level command and control from the NMCC to NCC occurred at 051858Z May 1983. Subsequent to this transfer, the OJCS Nuclear Accident/Incident Response (NAIR) Team was dispatched to the NCC to provide for OJCS coordination and assistance as required. Following an information exchange, the NAIR Team was released by the NCC Officer in charge. During subsequent NUWAX-83 play, the NMCC was tasked for various information requirements; however, in each instance the actions were referred to the NCC.

(2) CONCLUSION: DOD and Joint Staff elements had little involvement in Exercise NUWAX-83 subsequent to the transfer of command and control to the NCC.

(3) RECOMMENDATION: That the Joint Staff operating from the NMCC continue to aggressively monitor accident response operations after the transfer of command and control to a Service operations center has been accomplished. The Joint Staff and appropriate DOD response teams should be prepared to respond on short notice to inquiries from the National Command Authority and other senior Government officials.

g. TOPIC. Command Post Management (Navy Command Center).

(1) COMMENT/DISCUSSION:

(a) Service command centers have been identified as responsible for command and control of DOD response forces and personnel when directed by the NMCC. The Service command center, like the NMCC, may establish a specialized team for supporting the on-scene commander's operations at the accident site.

(b) For NUWAX-83, the NCC convened the Navy Nuclear Weapons Accident/Incident Recovery Crisis Action Team (CT). This team consisted of representatives from five functional areas: Radiation Health, Explosive Ordnance Disposal (EOD), Public Affairs, Security, and Legal Affairs. Additionally, representatives from FEMA, DNA, and DOE were present to advise on matters within the purview of their respective parent organizations.

(c) The primary function of the CT was monitoring activity at the scene of the accident. The CT accomplished this function principally through reports from the on-scene commander, press and wire service releases, and reports from the scene through FEMA and DOE channels. The CT within the NCC Crisis Action Center (CAC) maintained the status of actions and charts depicting the crash site, the NDA, and contaminated areas.

(d) The major sources of information from the accident scene for the NCC were two daily situation summaries which the OSC submitted. These reports described the current situation, key events since the previous report, and a plan of action for the following day. The NCC retransmitted the reports, received as AUTODIN messages, to organizations other than those to whom they were addressed when the information content warranted.

(2) CONCLUSION: The NCC Crisis Team was comprised of personnel who were qualified in nuclear weapons accident response procedures. This resulted in a capability to effectively use reports from various on-scene sources, minimizing the need for ad hoc queries. The usefulness of the Navy CT was validated during NUWAX-83.

(3) RECOMMENDATION: That any Service Operations Center not having an augmentation capability such as the Navy CT consider making provisions for such an element.

h. TOPIC. Interagency/Service Coordination (DOE EOC).

(1) COMMENT/DISCUSSION: At 051855Z May 1983, the DOE EOC received word by means of an NMCC conference call that an NDA had been established and that a press release had been made indicating nuclear weapons were present. The DOE Emergency Operations Center (EOC) did not receive a hard copy message containing the specifics of either event.

(2) CONCLUSION: The DOE EOC lacked adequate information concerning the initial press release acknowledging the presence of nuclear weapons and details indicating the boundary of the NDA.

(3) RECOMMENDATION: That nuclear weapon accident response elements, and particularly public affairs, ensure the Departments of Defense and Energy, and FEMA are included as addressees on all pertinent reports and press releases.

i. TOPIC. Command Post Management (DOE EACT).

(1) COMMENT/DISCUSSION: The DOE Exercise Emergency Action Coordination Team (EACT) met on 10 May 1983, following completion of weapons recovery, to discuss the next phase (site restoration) of operations. The EACT representative from the Office of Defense Programs proposed transferring the leadership responsibility for coordinating EACT response actions from the DOE Office of Defense Programs to the Office of Environmental Protection, Safety, and Emergency Preparedness. This transfer would not alter the composition of the EACT response team. Members of the EACT accepted the proposal, and the Director approved the transfer of leadership responsibility. The DOE EACT rationale behind the proposal was based on removal of the DOD weapons and the shift in focus of operations to cleanup and site restoration.

(2) CONCLUSION: The DOE EACT Director effectively coordinated a shift in team leadership from the DOE Office of Defense Programs to the DOE Office of Environmental Protection, Safety, and Emergency Preparedness following recovery and movement of the nuclear weapons and classified materials.

j. TOPIC. Interagency/Service Coordination (Army Operations Center (AOC)).

(1) COMMENT/DISCUSSION: Complying with instructions from the NMCC Deputy Director for Operations (DDO), JNACC alerted various response elements including Army Radiological Advisory Medical Team (RAMT) and Radiological

Control (RADCON) Teams. Army representatives objected to direct JNACC notification of Army units. The DDO's instruction to JNACC did not necessarily require direct notification, but JNACC could have implied authority with a statement in the January 1981 Joint DOD, DOE and FEMA Agreement which states: "The JNACC will select and notify specialized teams capable of responding to the accident or significant incident, inform the NMCC, Service, and DOE operations centers of actions taken, and when requested by the Services, coordinate the deployment of specialized teams."

(2) CONCLUSION: JNACC's procedures used to alert Army units during NUWAX-83 conflicted with Army procedures governing command and control of Army units.

(3) RECOMMENDATION: That the ATSD(AE) endeavor to clarify the Joint Agreement wording in question during the next revision of that document. Further defining the manner of "coordination" should allow the task to be accomplished consistent with Army procedures.

2. COMMAND AND CONTROL (FIELD PLAY)

a. Topic: Exchange of Liaison Officers

(1) COMMENT/DISCUSSION: Several of the major participating agencies did not respond with the capability, or did not recognize the need, to exchange liaison officers with the other major response elements. This was corrected to some degree as the exercise progressed, but was never fully implemented. FEMA was the notable exception which did provide liaison officers very early in the exercise.

(2) CONCLUSION: The ability to communicate to a particular agency through a member of that agency is invaluable. Much time and effort was saved when liaison officers were utilized. When utilized, information and confusion were reduced due to liaison officers being able to accurately and directly relay data on joint activities to their individual organizations.

(3) RECOMMENDATION: That Service response elements, DOE and FEMA insure the exchange of liaison officers at the earliest opportunity after arrival at the accident scene. If not already addressed, Services/agencies should include guidance to accomplish this in applicable directives and SOP's.

b. TOPIC. Operations Center Activities

(1) COMMENT/DISCUSSION: All of the major participants in the exercise maintained operations centers. In general, the operations centers did well at tracking the progress of activities which were their major responsibility. The same was not always true when the operations centers were attempting to track joint activities or activities directed by another organization. In many instances it appeared that the operations centers had not responded with all the maps, charts, etc. which are necessary to track the numerous on-going activities. For example, it was noted that one operations center had less than half of the special teams that eventually responded listed on the status board. This operations center failed to note the arrival and status of the teams, to note the capabilities of the teams, to establish effective coordination with the teams, to obtain team data on a timely basis for utilization, and to review various reports submitted by the teams. It is critical that the chain of command controlling the operations centers insure that the current

status of all germane activities is tracked and that the information is supplied to all necessary recipients. The partial lack of this type of information sometimes resulted in conflicting actions and duplication of effort. In addition, situation reports which were transmitted to headquarters and outside agencies were often late or incomplete because of the lack of current, valid information.

(2) CONCLUSION: It is of extreme importance that operations centers are adequately manned and properly equipped to track the status of all pertinent activities. There should be an evident chain of command from any forward operations center (command post) to primary operations centers and current information should be passed both up and down the chain as often as possible. This will greatly enhance overall control of response activities.

(3) RECOMMENDATION: That the Services, DOE, and FEMA insure prior adequate preparation of operations center equipment and materials, and that operations center personnel be further trained in the specifics of management of a nuclear weapon accident. Operations centers should be established with the flexibility to perform or track activities which have not been foreseen.

c. TOPIC. Standardization of Response Procedure

(1) COMMENT/DISCUSSION: OPNAVINST 3440.15 dated 30 November 1981 is the directive used by CNO to respond to nuclear weapon accidents. Because of its limited distribution (see OPNAVINST 3440.15, pages 12 and 13), numerous response agencies are unaware of Navy procedures. At the direction of JCS, DNA developed a Nuclear Weapon Accident Response Procedures (NARP) Manual

which provides a compendium of existing procedural guidance for a joint response to accidents involving nuclear weapons. Lessons learned from previous joint exercises (NUWAX-79 and 81) have been incorporated into the NARP.

(2) CONCLUSION: There were numerous non-Navy response elements which were utilizing the NARP as primary guidance and response efforts were hampered because of variances in recommended procedures.

(3) RECOMMENDATION: That there be wider distribution of OPNAVINST 3440.15 to appropriate response agencies. Also, that DNA and Navy carefully resolve any conflicts and potential confusion between OPNAVINST 3440.5 and the recommended procedures in the NARP Manual prior to the NARP becoming a final document. In addition, this should be accomplished for other Service directives as appropriate.

d. TOPIC. Standardization of Terminology

(1) COMMENT/DISCUSSION: On various occasions response elements misunderstood the exact status of the weapons due to lack of understanding of the terms "rendered safe" and "nuclear safe." The actual situation was that weapons had been declared "nuclear safe" but not "high explosive safe." This lack of knowledge of technical jargon could easily cause extreme problems for the federal establishment. For example, if a federal spokesman asked "Can a weapon cause a nuclear explosion?" and the respondent answered "No, the weapon has been rendered safe (meaning nuclear safe)," the media would undoubtedly be briefed that the weapon was safe. A subsequent high explosive detonation would be disastrous to the credibility of the federal government.

(2) CONCLUSION: This type of misunderstanding must be prevented due to the major problems that could occur. The scenario is realistic in that it occurred in NUWAX-83 on more than one occasion.

(3) RECOMMENDATION: That there be wide dissemination of this potential problem to response forces which deal with weapons recovery. It is recommended that weapons not be declared "safe" to the general audience of response agencies except when the weapons are both nuclear and high explosive safe. Services/Agencies should include guidance to identify and deal with this potential problem in applicable directives and SOP's, if not already existing there.

e. Topic. Joint Radiological Control Center (JRCC)

(1) COMMENT/DISCUSSION: A JRCC appeared to naturally evolve on D+1 to control the specialized teams and radiological data being generated. However, there was never an element which was clearly in charge of the JRCC and some of the functions which should have been performed by the JRCC were overlooked. It was felt that the JRCC was more a reaction to the bewildering array of specialty teams that descended on the accident site than a pre-planned organization for overall coordination.

(2) CONCLUSION: The JRCC should have been established as early as possible on D-Day. There should have been an agency designated to take the lead in the organization and operations of the JRCC. Radiological safety/-health physics elements from each participating federal and state agency should provide representation to the JRCC. All specialized elements (ARAC, ATRAP, ARG, RADCON, RAMT, OEHL, RAP, CDCE, DNA Advisory Team, etc.) should, if possible, provide representation to, or coordinate often, with the JRCC. Essentially, the JRCC should manage all radiological matters pertaining to a particular event.

(3) RECOMMENDATION: That the Services and the DOE establish a JRCC as soon as possible for management of radiological affairs. The JRCC should have membership from the affected states(s) also. Services/Agencies should include guidance to accomplish this in applicable directives and SOP's if not already in existence. In addition, all radiological response agencies should arrive at an accident site with a list of personnel, equipment and materials, associated capabilities, and logistical support required.

f. TOPIC. Joint Office of Communications Control (JOCC)

(1) COMMENT/DISCUSSION: A JOCC was established on D+2 to control the literal explosion of communications resources that appeared for NUWAX-83. This was accomplished by initiating a single point of contact for communications to alleviate the confusion caused by the numerous resources that were available. For example, there were 22 different VHF radio nets activated near Port Gaston by the afternoon of D+1.

(2) CONCLUSION: A JOCC should have been established as early as possible on D-Day. There should be a specific element or activity designated to take the lead in the organization and operations of the JOCC. Ideally, this would be a representative from the Office of Manpower, National Communications System who will have Federal level responsibility and authority for coordinating communications at the scene in accordance with the National Plan for Communications Support in Emergencies and Major Disasters. All response elements with communications assets should provide if possible, representation to the JOCC, or coordinate on a frequent basis with the JOCC. Essentially, the JOCC should manage and coordinate all communications resources available to the event being reacted to.

(3) RECOMMENDATION: That the Services, DOE, FEMA and the appropriate state(s) participate in the establishment of a JOCC as soon as possible for management of communications affairs. If not already provided for, Services/Agencies should include specific guidance regarding communications control in applicable directives and SOP's. In addition, all response agencies with communications should arrive at the accident site with a written list of communications equipment, required frequencies, associated capabilities, and logistical support required, ready for submission to the JOCC.

g. TOPIC. Joint Information Center (JIC)

(1) COMMENT/DISCUSSION: A JIC was organized and in operation early on D-Day. There was considerable confusion within the JIC due to the lack of procedural rules for the press, a badging program for the press, and the uncoordinated release of information by individual participants. However, by D+2 these problems had been solved and the JIC was functioning well. On D-Day, it appeared that the JIC was sometimes utilized as a place to which media could be referred when a question or line of inquiry proved difficult for a Public Affairs Officer at another location. In several instances, no better or more current information was available at the JIC than where the question was originally posed. It should be noted that the establishment of a JIC at the earliest opportunity is an excellent procedure, but that the JIC cannot take the place of a responsible public affairs officer responding to an accident scene as soon as possible. Those individuals responsible for immediately providing emergency public information must concentrate on that function and leave the administrative details of establishing the JIC to

others. The concept of a JIC is intended to provide a method of coordinated release of information by the major response participants and will, of necessity, take a few hours to establish as a valid operation. Prior to a functioning JIC being established, the various public affairs officers should attempt to coordinate the information as well as possible and to release pertinent information in a manner which will protect their credibility. Media should not be referred to the JIC, or elsewhere, unless it is known that a valid answer can be provided.

(2) CONCLUSION: The JIC was established, as necessary, but was not as effective as possible because of the lack of procedural rules, press credentials, and the release of information which had not always been coordinated. These problems were corrected by D+2.

(3) RECOMMENDATION: That the Services, DOE, FEMA and the appropriate state(s) combine to establish a JIC as soon as possible for the management of public affairs information, but that its establishment should not take precedence over the fact finding and reporting of emergency public information. Service/Agency guidance must accomplish this through applicable directives and SOP's. The directives/SOP's should stipulate that all media queries should be referred to the nuclear weapon accident site and that on-scene public affairs officers should respond as soon as possible based on local information and coordination, and meet the media initially without waiting for the establishment of the JIC.

3. COMMUNICATIONS (WASHINGTON PLAY):

a. TOPIC. BROKEN ARROW Record Report (Washington Area).

(1) COMMENT/DISCUSSION: The AUTODIN record copy of the BROKEN ARROW report sent by FLASH precedence from NOF Port Gaston, was marked CONFIDENTIAL.

(CFRD), and contained a date/time group of 051613Z May 1983. The JCS, Navy, and CINCLANTFLT message centers recorded a time of receipt (TOR) of 051743Z May 1983. The time of file (TOF) on the message was 051510. The reason for this TOF 50 minutes before the planned exercise start time is it is believed to have been incorrectly recorded and should have read 051710. The total communications time grossly exceeded the standards for FLASH precedence message traffic. Details of the accident not reported to the NMCC in the initial voice report were contained in the record copy report. Therefore, if responsible administrative and communication center personnel had processed the OPREP-3 BROKEN ARROW report in compliance with established procedures, essential accident information possibly could have been available to the NMCC, NCC, and CINCLANTFLT much sooner.

(2) CONCLUSION: The BROKEN ARROW record report encountered unsatisfactory processing and transmission delays, causing an excessively late TCR at the NMCC, NCC, and CINCLANTFLT.

(3) RECOMMENDATION: That Navy exercise planners review the data relating to the BROKEN ARROW report record copy and determine what caused the unacceptably late TOR of the message at major command centers.

b. TOPIC. Telephone Circuit Limitations (Washington Area).

(1) COMMENT/DISCUSSION: Communications between Washington-area and Port Gaston accident response elements were initially marginal because circuits to the site and telephone extensions on the site were limited. These limitations were not unrealistic; most accident locations would not be serviced by extensive, sophisticated communications resources. Most would require additional support to accommodate the demands of response elements

arriving at the scene. As NUWAX-83 players became familiar with the communications constraints and traffic routing alternatives, information exchange improved and details of the accident situation became clearer.

(2) CONCLUSION: The limited telephone circuits and lines available between Washington and the Port Gaston accident site impeded information flow, particularly during the initial hours of accident response, but should not be construed as unrealistic; most accident locations would not have extensive, sophisticated communications resources immediately available.

c. TOPIC. Interagency/Service Coordination (DOE EOC)

(1) COMMENT/DISCUSSION: DOE information sources indicated that an NDA was established, but its limits and boundaries were not specified. Further, for other than DOE elements, the status of deploying elements was not known to the DOE EOC.

(2) CONCLUSION: Information flow between DOE and other Federal Departments and agencies during the early response phase of the exercise was inadequate to maintain a current situation status in the DOE EOC.

(3) RECOMMENDATION: That the ATSD(AE) coordinate with the Secretary of Energy and Director, FEMA, to establish a Federal Emergency exchange system which will ensure rapid, timely information exchange during nuclear weapon accident response operations.

d. TOPIC. Interagency/Service Coordination (DOE EOC)

(1) COMMENT/DISCUSSION: DOD response elements did not advise the DOE EOC of briefings for senior officials and Members of Congress on D-Day and D+1. Considering the important technical support role DOE elements assume in

responding to a nuclear weapon accident, it would seem desirable and professionally prudent to request a senior DOE official to be present at important initial briefings. During Exercise PREMIER TASK VI, senior DOE officials did attend the principal briefings, but during Exercise NUWAX-83, a procedure to request DOE participation was not used.

(2) CONCLUSION: During D-Day and D+1, DOD response procedures were inadequate to ensure that a senior DOE official was present at important briefings. The presence of a senior DOE official at principal briefings involving a nuclear weapon accident would certainly be helpful, if not essential.

(3) RECOMMENDATION: That the ATSD(AE) take steps to ensure that a senior DOE official is invited to attend all principal briefings following a nuclear weapon accident.

e. TOPIC. Interagency/Service Communication (DOE EOC)

(1) COMMENT/DISCUSSION: DOD elements (NMCC NAIP Team and NCC) did not send liaison officers (LNO) to the DOE EOC. During the response and weapons recovery phases of a nuclear weapon accident, the presence of a DOD LNO at the DOE would be beneficial. The LNO would have exposure to all actions including discussions on pertinent issues, decisions and directives regarding deployments, etc. The LNO could collect pertinent information and ensure that it is available in a timely manner within DOD.

(2) CONCLUSION: The lack of a DOD LNO at the DOE EOC impeded a meaningful two-way information exchange during the response and weapons recovery phases of exercise play.

(3) RECOMMENDATION: That the ATSD(AE) recommend that the Services and NMCC provide for dispatch of an LNO to the DOE EOC, if personnel are available, upon notification of a nuclear weapon accident.

f. TOPIC. Deceptive Reporting (DOE EOC)

(1) COMMENT/DISCUSSION: Officials at the accident site released information indicating nuclear weapons were safely secured inside NOF Port Gaston under DOE control. When DOE EACT personnel requested the ARG to verify facts contained in the report, they were told that some aspects of the initial release were false and were a deliberate attempt to divert public attention from a simulated barge movement of the weapons.

(2) CONCLUSION: The release concerning weapons status confused DOE EACT personnel and may be the type of action which could severely damage the credibility of the Government officials in their dealings with the public.

(3) RECOMMENDATION: That the Secretaries of Defense and Energy review policies and provide explicit guidance to senior members of the nuclear weapon accident community regarding how much and what type of information should be released regarding the movements and disposition of weapons.

4. COMMUNICATIONS (FIELD PLAY)

a. TOPIC. Joint Office for Communications Control (See page 36, para 2f, Command and Control).

b. TOPIC. Repeaters for "Brick" Radios (Motorola Type)

(1) COMMENT/DISCUSSION: It was noted during the exercise that most of the response agencies utilize some type of "brick" radios. These radios worked well and were generally dependable, except for those instances when

communications were degraded by exceeding the maximum 5-8 mile range of the radios. This occurred primarily because NOF, Port Gaston, was approximately eight miles from the accident site. Those agencies, such as FEMA, who installed repeaters were able to communicate effectively.

(2) CONCLUSION: Repeaters are likely to be needed when responding with "brick" radios. It should be noted that each repeater utilized will require one additional frequency for communications whereas "brick" would require only one frequency to transmit and receive.

(3) RECOMMENDATION: That the responsible Services, DOE and FEMA, develop the ability to respond with appropriate repeaters for the "brick" type radio systems to provide for a minimum communications range of 10-16 miles. The repeaters should be used only when necessary to keep frequency utilization to a minimum.

5. CASUALTY CARE (WASHINGTON PLAY)

a. TOPIC. Processing Contaminated Human Remains (Washington Area).

(1) COMMENT/DISCUSSION: During NUWAX-83 play, there was little evidence in the Washington area that adequate procedures exist for the handling of contaminated remains. There were several exercise implementers who asked questions regarding the release of contaminated remains. In each instance, the question was referred to another Federal agency, and the desired exercise objective of identifying the appropriate Federal guidelines and procedures was not achieved.

(2) CONCLUSION: Actions by Washington area exercise participants were insufficient to identify procedures governing the processing and release of radioactive contaminated remains.

(3) RECOMMENDATION: That DNA, in coordination with the Department

of Health and Human Services, initiate actions to identify the Federal procedures for processing and disposing of contaminated remains and publish the procedures or appropriate references in the NARP Manual, as a minimum.

b. TOPIC. Casualty Reporting (Washington Area).

(1) COMMENT/DISCUSSION: Officials at the scene did not report completion of identification of deceased individuals until 081735Z May 1983. Reports from the site varied from 7 deceased to 15, and finally to 12. During an actual accident situation, the uncertainty and time required to account for deceased individuals could become a major public affairs issue and/or embarrassment.

(2) CONCLUSION: Casualty reporting was inadequate though it is unclear as to whether exercise artificialities contributed to the problem.

(3) RECOMMENDATION: That, as a matter of SOP, officials at the accident scene avoid giving out interim, tentative, or unconfirmed casualty figures. Because of the sensitive nature of casualty data, it should be a matter of policy that any Service/Agency with an accident response role not provide data which later have to be revised.

6. CASUALTY CARE (FIELD PLAY):

a. TOPIC. Systematic Casualty Care

(1) COMMENT/DISCUSSION: Casualty care in the exercise medical facilities was very good and, in the case of the Navy, was exceptional. However, there appeared to be no overall systematic method of searching for, receiving, verifying, and recording casualties in the field. This caused some exercise casualties to receive less than timely care during the early portions of the exercise. Examples were casualties which were not transported to a

medical facility as rapidly as was possible, and field medical tags not being completed on all casualties.

(2) CONCLUSION: Casualty care would have been improved by a systematic method or procedure which was closely coordinated between the medical response agencies.

(3) RECOMMENDATION: That the Services, DOE, FEMA, and the applicable state(s) coordinate at the earliest opportunity on medical procedures. If not already provided for, Services/Agencies should include guidance to accomplish this in applicable directives and SOP's.

7. PUBLIC AFFAIRS (WASHINGTON PLAY):

a. TOPIC. Interagency/Service Coordination (DOE EOC).

(1) COMMENT/DISCUSSION: The DOE EOC did not receive copies of any press releases made by the players in the Washington area or the JIC at the NTS. In essence, the scope and details of public affairs play was not evident at the DOE EOC.

(2) CONCLUSION: The DOE received insufficient public affairs information to gain an appreciation of what the coordinated PA response to the simulated accident involved.

(3) RECOMMENDATION: That Public Affairs personnel include the principal Federal Departments and agencies as addressees in all news release actions to ensure that all Federal personnel are aware of PA actions.

8. PUBLIC AFFAIRS (FIELD PLAY)

a. TOPIC. Joint Information Center (See page 37, para 2g, Command and Control).

b. TOPIC. Confirmation of the Presence of Nuclear Weapons.

(1) COMMENT/DISCUSSION: The most critical items in the area of

public affairs at a nuclear weapon accident are the provision of emergency information and the confirmation of the presence of nuclear weapons to allow for emergency actions necessary for the public's protection. Current directives allow an on-scene commander to determine if the confirmation of nuclear weapons at an accident site is an operational necessity. The Navy's confirmation of the presence of nuclear weapons occurred approximately 2 1/2 hours after STARTEX of this exercise. However, the confirmation at the accident site actually occurred about 15 minutes earlier when a state policeman screamed at onlookers to "stay back, there's nuclear bombs in there!" This situation points up the major problem that exists with "neither confirm nor deny." Civilian authorities will immediately release any information felt even remotely necessary to protect the population, while it has generally been the policy of the DOD to "neither confirm nor deny" the presence of nuclear weapons for the longest period possible consistent with public safety/alarm.

(2) CONCLUSION: The initial confirmation of the presence of nuclear weapons should be made by the DOD Service responsible in coordination with Federal, State, and local officials, if possible. The lack of confirmation by DOD while other authorities are confirming, or when the situation has clearly indicated to most observers that nuclear weapons are present, could be disastrous to the credibility of the DOD. A problem of this type would adversely impact numerous activities which are required to be completed at a later time in the accident response. Coordination and cooperation between Federal, state, and local authorities would be harmed.

(3) RECOMMENDATION: That Service responding force commanders exercise the option within DOD policy which currently allows the on-scene commander to make the determination of "confirm or deny" when necessary.

The responsible Service should be the entity which performs this action and the action should not be delayed to the extent that the DOD's credibility is damaged. If not already provided for, Service SOP's should include guidance to accomplish this rapidly once an accident has occurred.

9. SECURITY (FIELD PLAY)

a. TOPIC. Provision of Weapons Locations for Security Force.

(1) COMMENT/DISCUSSION: Player security forces were not briefed on the exact locations of all known nuclear weapons and components at the accident site. Consequently, the security force made wrong assumptions about the weapons locations and a serious breach of the simulated security requirement was committed.

(2) CONCLUSION: The security forces should be informed of the location of nuclear weapons and components to be guarded, and coordination with the security forces should be accomplished when moving the weapons.

(3) RECOMMENDATION: That the Services insure that security forces are adequately briefed on both weapons locations and weapons movements as soon as the information becomes known. The Services should include guidance to accomplish this in applicable directives and SOP's.

b. TOPIC. Establishment of National Defense Area (NDA).

(1) COMMENT/DISCUSSION: The Naval on-scene commander established a small, practical, and controllable NDA for the exercise which fully met all requirements. However, OPNAV Inst 3440.15, Enclosure 7, Tab A, Paragraph 2a(3), requires an NDA of 1,000 yards beyond the normal fragmentation range of most weapons when an accident is off federally controlled property. This

requirement is too inflexible to allow the on-scene commander to make a decision based on a particular accident.

(2) CONCLUSION: Published guidance was not followed by the on-scene commander because the actual needs in the field indicated a much more appropriate course of action.

(3) RECOMMENDATION: That OPNAVINST 3440.15, Enclosure 7, Tab A, Paragraph 2a(3), be changed to indicate more flexible guidance in the establishment of an NDA. In addition, the guidance in Paragraph 2a(3) should be reviewed and clarified.

10. LEGAL AFFAIRS (WASHINGTON PLAY).

a. TOPIC. National Defense Area (NDA).

(1) COMMENT/DISCUSSION: The Department of Defense developed the concept of an NDA to provide a means to safeguard DOD classified information and material on non-Federal lands within the United States. This concept is based on an interpretation of existing law, but has not been tested in the courts. A decision to establish an NDA on non-Federal land may be subject to legal challenge by the owners of that land. The Department of Defense and its components must be prepared, therefore, to defend its position or rapidly readjust the position to comply with court orders. In preparing to defend the NDA concept, DOD attorneys should be identified for immediate dispatch to the accident scene with prepared legal positions. Should a challenge be registered, the DOD attorneys would represent the position of the Federal Government.

(2) CONCLUSION: The legal implications of nuclear weapon accident response operations have attained a level of complexity which logically should

require that the DOD General Counsel and the Department of Justice actively participate in future NUWAX-type exercises and in any real accident situation.

(3) RECOMMENDATION:

(a) That the ATSD(AE) review plans to defend the NDA concept with the DOD General Counsel and appropriate representatives of other Federal Departments and agencies and that the DOD General Counsel and the Department of Justice actively participate in future nuclear weapon accident exercises.

b. TOPIC. Funding (Washington Area).

(1) COMMENT/DISCUSSION: During NUWAX-83 play, the issue of funding surfaced, however, it did not generate any Washington level decisions or guidance. Many of the difficult questions regarding the funding of site restoration and accompanying claims still were being negotiated when the exercise ended. The lack of comptroller participation in the exercise was an artificiality that prevented this area from being addressed adequately; however, it was apparent that funding guidance was insufficient to resolve the problems.

(2) CONCLUSION: The issue of funding was not realistically played in the Washington area during NUWAX-83.

(3) RECOMMENDATION: The ATSD(AE) should review nuclear weapons accident response funding guidance with the DOD Comptroller and other appropriate agencies to ensure that appropriate funding authorities can be arranged quickly in the event of an actual accident.

11. LEGAL AFFAIRS (FIELD PLAY)

a. TOPIC. Jurisdiction In and Around National Defense Area (NDA).

(1) COMMENT/DISCUSSION: An exercise actor (looter) was held by the

Marine security unit in the radiologically contaminated area without anti-contamination clothing for over one and a half hours due to confusion between local authorities and the Marine security unit on exactly who had jurisdiction. The Marines' security force believed its jurisdiction was strictly limited to the NDA and refused to proceed outside that area. Local authorities apparently believed there was radiological contamination in the area and would not take the looter into custody. The looter was eventually transferred through the Port Gaston Police to the FBI, back to the Port Gaston Police who then transferred him back to the Marine security unit. The looter was then transferred to the Naval Investigative Service and finally to the Navy Command Security Officer. Chain of custody was not maintained on material evidence relating to the crime. Neither the Marine security force nor the Port Gaston Police advised the looting suspect of his constitutional rights before interrogation. Several instances occurred where the looting suspect's simulated health and safety were not taken into consideration even though the exercise play was taking place in a radiologically contaminated area.

(2) CONCLUSION: In effect, a "jurisdictional no-man's land" was created where the local and federal authorities each refused to function. Communications and coordination between the local authorities (police) and Marine security were confused, inadequate, and were not followed through when necessary. The Military Judge Advocate was never informed or consulted on the jurisdictional problems while the suspect was being transferred through numerous law enforcement authorities.

(3) RECOMMENDATION: That the Services, DOE and FEMA develop detailed

plans for addressing jurisdictional problems which will arise in connection with the creation of an NDA. These plans should stress the use of advisement of constitutional rights and regard for the health and safety of suspects. Military Judge Advocates should be consulted at the earliest opportunity when jurisdictional problems arise.

12. SITE RESTORATION (WASHINGTON PLAY):

a. TOPIC. Site Restoration Planning (Navy).

(1) COMMENT/DISCUSSION:

(a) The Exercise CNO expressed the opinion that site restoration planning represents a significant problem for the OSC. The availability of qualified local Service personnel to interact with Federal and state officials in addressing site restoration planning requirements is extremely limited.

(b) Site Restoration is a technically demanding effort which requires a broad range of expertise. It includes all of the functions involved in assessing the magnitude of the decontamination and site restoration problem, and preparing a site restoration plan. It also includes restoring the affected area to an acceptable condition in accordance with the plan.

(c) The DNA Nuclear Weapon Accident System Description, dated April 23, 1982, contains a proposed procedure intended to solve the site restoration problem. The proposed procedure is a formation of a Federal Site Restoration Support Group comprised of technically qualified representatives from all appropriate Federal departments and agencies. The group would provide Federal site restoration planning and operational support to the state through the FEMA representative at the scene. Officials at Port Gaston formed a similar group to address cleanup standards and to develop the overall plan

for restoration. This group included representation from FEMA, Jefferson County, the Commonwealth of Virginia, Navy, DOE, EPA, Department of Interior, DNA, HHS, and the US Air Force Contamination Disposal Coordinating Element.

(2) CONCLUSION: The OSC's efforts to plan for the recovery and removal of classified defense information resulting from a nuclear weapon accident are complicated by the added task of contributing to site restoration planning.

(3) RECOMMENDATION: That the ATSD(AE) review, determine, and establish clear assignment responsibility for site restoration.

b. TOPIC. Precedence for Cleanup and Restoration (DOE EOC).

(1) COMMENT/DISCUSSION: The DOE EOC received a draft copy of a proposed site restoration plan being considered by site players just prior to termination of the exercise. The draft proposed plan for disposition of the contaminated area was unacceptable to DOE personnel. Their rationale for disagreement was that the proposed plan did not reflect and analyze a course of action requiring immediate cleanup and restoration of the area to its former status and use.

(2) CONCLUSION: The precedent to undertake nearly complete site restoration was established at Palomares, Spain, and Thule, Greenland, and should be considered as a potential site restoration requirement in the future, whether in an exercise or actual accident environment.

(3) RECOMMENDATION: That the Secretary of Energy and the Assistant to the Secretary of Defense (Atomic Energy) amend the Joint DOD/DOE/FEMA agreement for nuclear weapon accident response and include the requirement to address complete cleanup and restoration of accident sites to their former

status and use as one of the primary restoration options to be considered.

c. TOPIC. Cleanup Standards (Washington Area)

(1) COMMENT/DISCUSSION: Exercise participants in the Washington area and at Port Gaston addressed the issues of cleanup and decontamination during NUWAX-83; however, there is no agreement among Federal agencies regarding the radiological safety standards which apply. Players were tasked to develop a site restoration plan without knowing the standards which would apply to the effort. This observation has been made in each major nuclear weapon accident exercise thus far.

(2) CONCLUSION: Currently, there is no agreement among Federal agencies as to the radiological safety standards to apply for cleaning up and decontaminating an area as a result of a radiological accident.

(3) RECOMMENDATION: That the ATSD(AE), in coordination with the Secretary of Energy and the Administrator, EPA, intensify efforts to establish radiological safety standards for use in site restoration following an accident involving release of radiological materials.

13. SITE RESTORATION (FIELD PLAY)

a. TOPIC. Lack of Guidelines for Radiological Contamination Clean-up.

(1) COMMENT/DISCUSSION: See pages 17-18, and pages 51-53, Radiological Guidelines.

(2) CONCLUSION: The lack of a guideline for radiological clean-up of an accident site has existed during the entire NUWAX series of exercises. This problem has been illuminated during each exercise as well as at several real-world accident sites.

(3) RECOMMENDATION: That the ATSD(AE), in coordination with the Secretary of Energy and the Director, EPA, form a joint task group to develop radiological contamination clean-up criteria and guidelines at the Federal level.

14. RADIOLOGICAL SAFETY AND CONTROL (WASHINGTON PLAY)

a. TOPIC. Atmospheric Release Advisory Capability (ARAC) (Washington Area)

(1) COMMENT/DISCUSSION. Washington area exercise participants were extremely pleased with and complimentary of the revised ARAC plot format. Non-technically qualified personnel have had difficulty in understanding previous versions of the ARAC plot. During NUWAX-83, the ARAC plot was understandable and useful to all participants.

(2) CONCLUSION: The revised ARAC plot represented a significant improvement when compared to earlier products. Exercise players were able to interpret the plots quickly and to use them in briefings presented to senior officials.

(3) RECOMMENDATION: That the ARAC Center, Lawrence Livermore National laboratory (LLNL), continue to use the revised ARAC prediction format because it is more meaningful and understandable to response and decision makers.

b. TOPIC. Dissemination of the Atmospheric Release Advisory Capability (ARAC) Prediction (NMCC, NCC, DOE EOC, and FEMA EICC).

(1) COMMENT/DISCUSSION: The NMCC Operations Team (OT) received the ARAC plot from the APAC Center at 051745Z May 1983 by telefax. The DOE EOC received the plot from the ARAC Center at 052015Z May 1983. The excessive

delays in receipt of ARAC plots by principal national-level command centers reinforce the observation made in Exercise PREMIER TASK VI that dissemination is a time-consuming process warranting improvement. ARAC plot data provides the first estimate of the potential consequences of a nuclear weapon accident. The ARAC predicted consequences could become an extremely critical element in determining courses of action if there are no military survivors at the scene and if response forces must travel long distances to reach the site.

(2) CONCLUSION: ARAC plot data could be an essential element in accident response decision making processes and, therefore, LLNL should have a procedure in place which ensures rapid dissemination of the plots to principal national-level command and operations centers.

(3) RECOMMENDATION: That the ATSD(AE), in coordination with the Secretary of Energy, develop and implement an expeditious ARAC plot distribution system for use throughout the entire nuclear weapon accident response community.

c. TOPIC. Aerial Measuring System (AMS) (DOE EOC).

(1) COMMENT/DISCUSSION: The DOE Aerial Measuring System (AMS) team conducted an actual survey of the NTS exercise site on 5 May 1983. Readings were processed and products (marked aerial photos) were air-expressed to the DOE EOC (Germantown) overnight. Products arrived at the DOE EOC at approximately 061440Z May, and distribution was made immediately to other Washington-area command and operations centers. The AMS data, however, was presented in technical measurements (microcuries/sq meter ($\mu\text{Ci}/\text{m}^2$)). DOE personnel, therefore, initiated action to transpose the data into proposed

protective action guidelines, contained in the ARAC plots received on 5 May, to the AMS plots.

(2) CONCLUSION: AMS material was received in Washington on a timely basis. DOE personnel found it necessary to transpose protective action guidelines, contained on ARAC plots, to the AMS plots to make the material more meaningful to non-technical players.

(3) RECOMMENDATION: That the DOE initiate action to insure AMS material includes protective action guidelines similar to those reflected on the revised format used for the ARAC plots.

d. TOPIC. Disposition of Contaminated Waste (DOE EOC).

(1) COMMENT/DISCUSSION: The NUWAX-83 scenario depicted an increasing tempo of public opposition to nuclear war, nuclear weapons, and the transport of radioactive materials. On 9 May 1983, the ARG Team Leader requested DOE guidance on disposition of contaminated waste. DOE EOC personnel commenced a process of deliberate, careful consideration of available facts, report indicators, and potential future public actions. They also considered actual past experiences and the action taken to cope with problems. By 10 May, problem indicators highlighted the need for preparation of various alternatives to accommodate the contaminated waste at the accident site until it could be moved without undue risk. At ENDEX, DOE EOC personnel were refining alternatives to cope with the problem.

(2) CONCLUSION: The DOE EOC action to provide the ARG team leader with disposition instructions for contaminated waste was comprehensive and thorough. The alternatives being considered at ENDEX, e.g., store temporarily

at NOF Port Gaston, load containers on barges and move by water, move by special train, etc., would have provided senior officials sufficient options with which to satisfy a broad range of problem situations.

15. RADIOLOGICAL SAFETY AND CONTROL (FIELD PLAY)

a. TOPIC. Joint Radiological Control Center (See pages 35 and 36, para 2e, Command and Control).

b. TOPIC. Contamination Control Station/Line Procedures.

(1) COMMENT/DISCUSSION: Contamination Control Stations (CCS's) were operated during NUWAX-83 by both the COV and the Navy. Initial processing of people was slow but improved with time and practice. Although capable of processing response force personnel none of the CCS's would have been capable of efficiently handling the numbers of indigenous personnel who would have required processing in an actual accident. As an example of the time required for processing, all personnel were withdrawn from the PCA at 1800 on D-Day at which time approximately 60 people required processing through the Navy CCS. Processing was not completed until 2015 using a dual line. Processing time was approximately four minutes per person. To place the problem in perspective it should be noted that it was simulated that 815 residents were evacuated from the area on the basis of initial ARAC plots. The Navy firefighters were left in socks, pants, and T-shirts while processing through the CCS. No provisions were made for returning the firefighters to their quarters or providing them replacement clothing. It should be anticipated that many bystanders will be left in similar, or worse, circumstances and it is not appropriate to abandon them when they depart the CCS. Personal and

organizational equipment, e.g., RADIAC instruments, cameras, rifles, protective masks, web gear and turn out gear were contaminated during the course of the exercise. Existing guidance on CCS operations states equipment should be placed on a table or ground sheet while the individual is processed and the equipment monitored out separately. Contaminated equipment and clothing were held at the CCS. Contaminated items held at player CCS's were not individually bagged, and contaminated personal clothing was placed in the same bag with anti-C's. Player CCS procedures did not initially include provision for decontamination of equipment and materials used or removed from the RCA. There was no effective receipting system for personal or organizational items which could not be immediately decontaminated. This would create a major accountability problem for organizational equipment and a major legal problem for claims involving personal possessions. The Navy hotline included shower facilities with a holding bladder for personnel decontamination; however, no such facilities were available at the COV hotline.

(2) CONCLUSION: Current CCS methods are inadequate for processing large numbers of people. Guidance on CCS operations needs to include release limits and procedures for receipting for articles held for decontamination. Equipment decontamination, at least on a limited scale, is required at the CCS.

(3) RECOMMENDATION: That the Services, DOE and FEMA (for the benefit of state planners) include specific, detailed guidance in applicable directives and SOPs on receipting for contaminated articles and the re-clothing of personnel.

Better procedures and equipment with which to rapidly process large numbers of potentially contaminated personnel need to be developed, identified, or obtained.

c. TOPIC. Evacuation of Personnel From a Contaminated Area.

(1) COMMENT/DISCUSSION: According to umpire logs, evacuation from the contaminated area started at 1024 and was completed at 1120. The details of the timing and method of the simulated evacuation of the 815 residents from the area on D-Day are unknown, however, it is questionable whether adequate procedures existed at the time. It is estimated that at 4 minutes per person (see page 57, para 15b(1)), approximately 54 manhours of personnel monitoring would be required. The actual time involved would depend upon the availability of suitable instruments and qualified personnel to conduct such an operation. Minimal availability can be expected prior to D+1. Alternative methods could be developed to process the people without RADIAC instruments, but procedures for such processing are not established. Such processing would require comprehensive accounting of personnel evacuated, shower facilities, a receipting procedure for personal possessions, and a supply of clothing to be issued. A thorough accounting of personnel would allow complete monitoring at a more advantageous time. Alternatively, the potential health hazard of leaving people in their homes and providing instructions to remain inside, bag clothes worn outside, and other instructions concerning safety and eating and drinking until monitors can define high risk areas and remove people in an orderly manner should be investigated.

(2) CONCLUSION: Evacuation will be a time consuming task and, due to exercise constraints, evacuation procedures probably have not been realistically evaluated.

(3) RECOMMENDATION: That the Services, DOE and FEMA review, and correct as appropriate the existing guidance on anticipated problems with timely evacuation.

d. TOPIC. Air Samplers.

(1) COMMENT/DISCUSSION: Only a limited number of air samplers were observed in use by the players. The Navy briefly deployed a STAPLEX air sampler approximately two miles downwind immediately after the accident, and operated a STAPLEX sampler at the Field Command Post as a background sampler, one at the CCS, and one immediately downwind of the crater. The latter sampler was placed and largely ignored. It should be noted that the EOD Initial Response Force spent over one hour emplacing the air sampler by the crater. All other operations were at a standstill while this was being accomplished. The requirement for the EOD Team to emplace an air sampler is contained in a Navy Yorktown OPSORD. The number and type of air samplers utilized by the COV and the specialized teams is unknown, however, one air sampler was taken to the perimeter of the contaminated area at a downwind location and air samples of short duration taken. In contrast with player operations, the JTG RADCON Division operated 11 air sampler stations continuously during the exercise. No significant resuspension was observed. Air sampling was not performed after "fixing" of contamination on D+4. It is not clear what criteria was used to determine that fixing was required. The procedures for collection and use of air sampling data varied by organization. Based on umpire reports it appears the COV used air sampling data as a basis for evacuation of the Jefferson County building. Based on observed actions it is concluded that there has been little thought given to the placement,

frequency of readings, and role of air samplers in response actions. Air samplers were not rotated to face into the wind. If monitoring is being performed to insure contamination is contained within an area, the samplers should face the area and rotation is not necessary. However, a wind activated switch may be desirable so run time only reflects downwind operation. It is possible exercise artificialities reduced interest in this area, but it is believed there is insufficient published guidance on the use of air samplers and the data and information collected. CCS's are established in clear areas. The only airborne hazard to be expected is that which is picked up on equipment, clothing, and anti-contamination clothing worn or carried by the people being processed. Considering the probable levels of contamination such people and equipment will be in, the percentage of contamination which will be transferred to articles being taken from the area, and the percentage of contamination carried out which may become airborne, the value of air sampling in the CCS becomes questionable, as does the practice of wearing masks in the CCS. Frequent ground monitoring and swipes in and around the CCS will provide an indication that contamination is being tracked or carried into the area. At that time, masking can be performed as a precautionary response until the source of the contamination can be identified.

(2) CONCLUSION: Guidance and procedures for emplacing and utilizing air samplers is inadequate and differs widely among response agencies. The guidance which is available did not appear to be followed during much of the exercise. The Navy EOD Initial Response Force probably would be more

effective accomplishing their primary mission on the weapons and not having to emplace air samplers which can be done by some other response element.

(3) RECOMMENDATION: That the Services and DOE review, and incorporate, detailed guidance on the emplacement, utilization, and data analysis of air samplers in applicable directives and SOP's. In addition, the Navy Yorktown OPSORD which requires the FOD Team to emplace an air sampler should either be changed to indicate another response element which can accomplish that task, or the EOD Teams should receive additional training in the rapid emplacement of air samplers.

e. TOPIC. Radiological Detection Equipment at the Local Level (Town, City, County, etc.).

(1) COMMENT/DISCUSSION: It was noted that Jefferson County response authorities possessed civil defense instruments that were incapable of detecting alpha contamination.

(2) CONCLUSION: This situation undoubtedly exists at the local level in most states. It is unreasonable to expect every local authority to be able to purchase alpha detection equipment.

(3) RECOMMENDATION: That the Services, DOE and FEMA note this situation and provide for coordination and sharing of data, and perhaps even monitor personnel from the response force elements that do possess alpha detection equipment in order to help the local authorities accomplish monitoring responsibilities. Information on this civil sector shortfall and recommended solutions to it should be included in applicable directives and SOP's.

f. TOPIC. ATRAP Calibration Support Capability.

(1) COMMENT/DISCUSSION: AN/PDR-56 ALPHA Survey Meters used by the SRF and EOD forces were pre-calibrated for the exercise at Navy repair facilities with approved procedures. The ATRAP, which provided a pool of thirty AN/PDR-56 to replace Navy instruments while in repair on-scene, deployed with new AN/PDR-56 meters prior to any AF acceptance, testing, or calibration. The factory calibration was presumed to be acceptable. A Navy AN/UDM-7 calibration device, provided to ATRAP just for the exercise, showed one randomly picked pool instrument to be out of calibration.

(2) CONCLUSION: ATRAP has no AN/UDM-7 calibration capability of its own, therefore instruments could not have normally been checked or calibrated with approved procedures during the response effort.

(3) RECOMMENDATION: That the Air Force take action to outfit ATRAP with an AN/UDM-7, Alpha Survey Meter Calibration Device, and that ATRAP insure all instruments they maintain are routinely pre-calibrated.

g. TOPIC. AN/PDR-56 Technical Deficiency

(1) COMMENT/DISCUSSION: Navy radiological monitoring personnel observed false readings on the AN/PDR-56 alpha survey instrument. Investigation revealed that the unshielded coiled cable between the detector and the instrument package was subject to electromagnetic interference (EMI) from radio transmissions (including hand held radios).

(2) CONCLUSION: There is a material deficiency in the AN/PDR-56 which can result in EMI induced false readings.

(3) RECOMMENDATION: That DNA initiate action to have laboratory tests conducted to evaluate the NUWAX-83 evidence and, if valid, that all unshielded cables be replaced with shielded cables.

h. TOPIC. Security Clearances for Specialized Teams.

(1) COMMENT/DISCUSSION: Specialized Teams, ATRAP, AFRAT, and several DOE groups were delayed several hours or more from entry and integration into Navy response capabilities apparently because of overloading of the security clearance system administrative capabilities. Provisions do exist for accepting handcarried clearance data and for the on-scene commander to certify, under emergency conditions, clearances for essential personnel with appropriate hard copy following at a later date.

(2) CONCLUSION: Access to the response effort by specialized teams was delayed because of administrative delays in security processing. This effectively denied immediate availability of these teams upon their arrival.

(3) RECOMMENDATION: That the Services and DOE recognize the potential for this administrative bottleneck and review existing procedures accordingly. It may well be necessary that additional guidance be included in applicable directives and SOP's.

i. TOPIC. Requesting DOD/DOE Special Team Support.

(1) COMMENT/DISCUSSION: The Navy's demonstrated procedure for the provision of special teams to the response effort was for CINCLANTFLT and the CNO to be responsible for initiating the necessary requests. This procedure was in agreement with OPNAV INST. 3440.15. This, in real life, would have delayed arrival of specialized teams which could have been utilized at the accident site.

(2) CONCLUSION: There are existing Service procedures with which to alert special teams upon notification of a nuclear weapon accident. The Navy followed this published guidance in its actions to deploy the specialized teams.

(3) RECOMMENDATION: That the Services and DOE automatically deploy all principal specialized teams at the time of confirmation of a nuclear weapon accident. The Services and DOE should verify, or develop, guidance to accomplish this in applicable directives and SOP's. The need for these teams early on the scene in cases of extensive contamination far outweighs the cost of redeploying them if it turns out only limited contamination is involved and they are not ultimately required.

j. TOPIC: Radiological Surveys

(1) COMMENT/DISCUSSION: Initial surveys by the COV were with beta/gamma instruments which would have been of limited value with actual plutonium contamination. Ground surveys in and around the NDA were prohibited by EOD forces for personnel safety reasons to include the perimeter where the Marine Security Force was positioned. A preoccupation with EOD concerns prevented utilization of specialized radiological teams in areas in which they could have been safely and productively put to use. Over 75% of the contaminated area was outside the NDA. Ultimately, and virtually on their own initiative, in late afternoon of D+1, the Army RADCON Team performed a perimeter survey of the NDA, which provided the initial ground deposition data received by the Navy Operations Center. Most specialized radiological teams were idle through close of business on D+1, and minimal definition and

characterization of the contaminated area had occurred. On D+2, the DOE RAP and COV commenced monitoring the area. By late afternoon on D+2, EOD operations permitted the entry of radiation survey teams into the NDA and the Army RADCON Team defined three times background contour. Almost all plots used by the players consisted of grease pencil overlays on the AMS plot. A requirement for laser rangefinders to accurately survey the area was identified by evening on D+4. Due to exercise limitations on time and money, approximately 50 meter spacing was laid out by the Navy in the absence of the laser survey equipment. The conventional survey equipment brought by Army RADCON was not used in laying out the grid. The rationale for the spacing used in the grid is not understood.

(2) CONCLUSION: Before specialized teams arrive, instrumentation available to response forces is adequate to identify the existence of a radiological problem. The radiological instrumentation and analytical resources available from the combined assets of response forces present at NUWAX-83 were adequate to survey and characterize the contaminated area. Engineering survey equipment possessed by forces responding to NUWAX-83 was marginally adequate to support the radiological surveys required, however, and available equipment was not fully utilized. Initiation of radiological surveys was not given sufficient priority early in the accident response. Once it had been determined that contamination had been released, radiological and EOD operations should have been conducted concurrently with sufficient physical separation to provide safety for personnel conducting radiological surveys. There is inadequate current guidance on radiological survey procedures to be used in response to a nuclear weapon accident.

(3) RECOMMENDATION: That the Services and DOE identify additional equipment necessary for accurate radiological and engineering surveys and, as it becomes available, develop plans to effectively utilize that equipment. Response guidance should also include plans for immediate initiation of initial surveys by specialized teams upon their arrival.

k. Topic. SRF Radiological Health Officer (RHO)/Health Physics Support

(1) COMMENT/DISCUSSION: During the course of the exercise it was apparent that one RHO on the SRF staff could not physically perform his required functions and participate in all the varied staff events where his presence and expertise would be required, e.g., directing the collection, analysis, and interpretation of data from the field; advising the SRF medical representative; advising the SRF site restoration representative; coordinating bioassay resources, data collection, and data interpretation; advising the OSC on radiological discussions; briefing the OSC in preparation for public releases and press conferences; and participating in JRCC operations.

(2) CONCLUSION: The SRF RHO could not effectively perform all the functions that are required of his position on the SRF staff.

(3) RECOMMENDATION: That Service and DOE response organizations either ensure an adequate number of health physics/radiation safety personnel be dispatched as members of the SRF staff to support the PHO, or that standing procedures be established for drawing personnel, upon arrival of the specialized teams, to assist on the staff. In essence, this will allow the creation of an ad hoc JRCC until such time as one is formally established. The requirement for the Services and DOE to have pre-accident plans describing specifically how the JRCC will be organized and how the specialized teams

will be utilized upon arrival is, likewise, essential for an effective response (See pages 35 and 36, para 2e).

16. LOGISTICS AND SERVICE SUPPORT (WASHINGTON PLAY)

a. TOPIC. Transportation of Radioactive Source Equipment (Army).

(1) COMMENT/DISCUSSION: The Radiological Advisory Team (RAMT) from Walter Reed Army Medical Center (WRAMC) was scheduled to depart Dulles International Airport via American Airlines on 6 May 1983. Upon arriving at the airport, American Airlines personnel informed the RAMT that the airline could not ship the team's low-level radioactive source equipment on board the flight. FAA regulations permit commercial airlines to transport low-level radiological equipment of the type used by the RAMT on scheduled flights; however, the FAA regulations also stipulate that acceptance of the cargo rests with the airlines. Because of American's action, the RAMT personnel departed without their equipment on the scheduled flight. Prior to departure, they queried other airlines at Dulles and determined that Western Airlines was both aware of FAA regulations and would accept the equipment for shipment on a later flight.

(2) CONCLUSION: RAMT personnel were effectively separated from their equipment and hindered in providing timely support at the accident site because their chosen commercial airline was not prepared to accommodate shipment of a low-level radiological source.

(3) RECOMMENDATION: That the RAMT, and other nuclear accident response teams that may depend on commercial air transport for rapid deployment to an accident site along with low-level radiological source equipment:

(a) Acquire and retain a copy of appropriate FAA regulations concerning shipment of the equipment.

(b) Alert local airline officials to the possibility of short notice travel requirements and request a letter of authorization which contains appropriate instructions concerning the source equipment and which can be provided to airline personnel at the departure airport, if required.

(c) Determine that an air carrier will accept the source equipment on the flight before booking reservations for team members.

17. LOGISTICS AND SERVICE SUPPORT (FIELD PLAY).

a. TOPIC. Nuclear Weapon Accident Response Unique Equipment.

(1) COMMENT/DISCUSSION: Logistical requirements generated by an accident need to be identified in detail. For example, approximately 1700 sets of anti-C's were issued in NUWAX-83. While many of them were not contaminated prior to turn-in and could have been re-used, there would have been many more people involved in an actual accident. The availability and capacity of a contaminated laundry will determine the number of anti-C's required to support an accident response. EOD and specialized teams possessed a limited number of anti-C's but not enough to support sustained operations. Disposable anti-C's were used in a few cases and had limited durability for large people. Their durability for use in rough terrain, or for strenuous tasks, is questionable.

(2) CONCLUSION: Logistical requirements such as anti-C's, masks, and replacement clothing need to be estimated and guidance published for use by response forces.

(3) RECOMMENDATION: That the Services and DOE review current guidance and, as required, include estimates of accident peculiar logistics requirements, in support of sustained operations, in applicable directives and SOP's.

ANNEX A TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT
NAVY AFTEP ACTION REPORT LESSONS LEARNED

1. This annex contains three reports provided by the Navy. The reports, identified below, are located in separate appendices to this annex.
2. Appendix 1 contains the Initial Response Force After Action Report Lessons Learned.
3. Appendix 2 contains the Service Response Force After Action Report Lessons Learned.
4. Appendix 3 contains the Commander in Chief, U.S. Atlantic Fleet (CINCLANTFLT) After Action Report Lessons Learned.

APPENDIX 1 TO ANNEX A TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT

INITIAL RESPONSE FORCE (IRF) AFTER ACTION REPORT LESSONS LEARNED

1. COMMAND AND CONTROL:

a. Topic: Radiation Confirmation

(1) COMMENT/DISCUSSION: The inability of the IRF OSC to rapidly determine if there was any radiation present was the first major hurdle which had to be overcome. The responding fire department had Radiac equipment on board the truck, and was at the scene in 6 minutes. Actual readings on AN/PDR 43 indicated no gamma present. Navy reconnaissance of the scene is historically conducted by EOD personnel on site and although pre-briefed on movement, the EOD teams are not dressed out and it may be in excess of 1 hour before they enter the site. This delay may not be acceptable for information of this importance.

(2) RECOMMENDATION: State of the art wrist/belt alarm gamma/beta/alpha detectors be developed for firefighters and emergency response personnel.

APPENDIX 2 TO ANNEX A TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT

SERVICE RESPONSE FORCE (SRF) AFTER ACTION REPORT LESSONS LEARNED

1. COMMAND AND CONTROL:

a. Topic: Interagency/Service Coordination

(1) COMMENT/DISCUSSION: The numerous specialized organizations that provided a service to the on-scene commander proved to be highly professional, enthusiastic and extremely capable. These teams were requested by the Initial Response Force (IRF) commander and the Service Response Force (SRF) through the National Military Command Center (NMCC). In the early stages of the exercise, NMCC took the initiative and alerted/requested specialized teams. NMCC turned over operational control of the exercise at the working level to the Chief of Naval Operations (CNO) late on D-Day. From D-Day through D+2, these Interagency/Interservice teams arrived on site and reported to the SRF commander. Keeping track of what teams were requested, their capabilities, estimated time of arrival and even their actual location when on site, proved difficult. Federal Emergency Management Agency (FEMA), Commonwealth of Virginia (COV) and local government all requested liaison officers from the Navy. Because of the limited number of Navy personnel on scene, one liaison officer was assigned to work among numerous agencies. On the third day of the exercise an additional liaison officer was provided to work with FEMA and COV. FEMA and COV provided liaison officers to the Navy OPS Center. However, COV pulled their liaison officer out after a couple of days because they did not have sufficient personnel with them who had appropriate clearances.

(2) CONCLUSION:

(a) To make full use of the capabilities of the special teams assisting the SRF commander, it is absolutely essential that as teams arrive on site, they provide a firm point of contact and be provided a liaison officer from the SRF commander's staff.

(b) It is necessary to pre-designate liaison officer positions from Navy, state, FEMA and local government and ensure that qualified personnel have proper clearances and are available to fill these positions.

(c) Exercise NUWAX-83 pointed out the need for more actual exercises and CPX's to improve coordination and utilization of assets between the SRF commander and the Interagency and Interservice teams designated to support him.

(3) RECOMMENDATIONS:

(a) The SRF commander pre-designate sufficient, well qualified, liaison officers on his staff to work with the specialized teams which support him.

(b) Ensure Federal, state and local authorities are aware of the necessity to provide liaison officers with appropriate clearances as those teams arrive on site.

(c) Conduct actual exercises and CPX's more frequently. Recommend CPX's be conducted on a semi-annual basis, rotating the duties of the SRF commander through all pre-designated SRF commanders of all Services, and that all 50 states become involved.

b. Topic: Interagency/Interservice Support

(1) COMMENT/DISCUSSION: During the conduct of the exercise, the operational and logistical support was outstanding. The artificialities of the exercise required substantial pre-staging of personnel and equipment to the exercise scenario location of "Port Gaston." Nearly all communications were in place or pre-coordinated prior to the accident and arrival of the SRF. Frequency clearances had been obtained, satellite channels were assigned, secure voice interface points arranged, telephones installed, and all requisite equipment made available. Exercise personnel were on site, pre-staged or readily available. Interagency and Interservice personnel were prepared to travel, fully trained and fully equipped. The necessity for liaison between Federal, military, state and local authorities to set up the exercise scenario resulted in a trusting rapport between those authorities when the same personnel became exercise participants.

(2) CONCLUSION: Certainly the superb cooperation between the exercise participants can, to some extent, be attributed to the participants familiarity with each other as a result of "setting up" the scenario.

(3) RECOMMENDATION: That short notice CPX's be conducted using various military SRF's, state and local authorities and Federal agencies that have not worked as closely as those of the Navy and the Commonwealth of Virginia.

c. Topic: Disparities Between Current Directives and Nuclear Weapons Accident Response (NARP) Manual

(1) COMMENT/DISCUSSION: An enormous amount of technical expertise augments the SRF staff as various Accident Response Group (ARG) units arrive on site. These professional, highly trained units have far more capabilities and functions than described in the NARP and OPNAVINST 3440.15. Some of these team functions overlap one another, especially in the area of radiation survey and decontamination control. An example is the Fiddler monitoring capabilities of the Occupational and Environmental Health Laboratory (OEHL)/Air Force Radiation Assessment Team (AFRAT) which is not listed in any job description.

(2) CONCLUSION: Unless the SRF is fully aware of the capabilities and functions of the various specialized teams and what equipment these teams have actually brought with them to the accident site, a duplication of effort, often with less efficient equipment, could result.

(3) RECOMMENDATIONS:

(a) That a consolidated listing of complete technical capabilities of each ARG unit and specialized team be described in the NARP and OPNAVINST 3440.15.

(b) Each of those teams provide a complete list of equipment on site to the SRF commander when they report in.

d. Topic: Operating Procedures

(1) COMMENT/DISCUSSION: The command and control portion of the exercise can be broken down into two major phases: first, the on site actions to contain the situation, and second, the necessity to disseminate information to higher authority. To accomplish the on-site actions, the SRF

commander conducted scheduled and unscheduled meetings with his staff and the specialized teams supporting him. Meetings with Department Heads and Senior Civilians representing specialized teams were scheduled twice daily at 0700 and approximately 1900 depending on the situation. At these meetings, the SRF commander received a comprehensive overall brief from the Operations Officer followed by updated and detailed briefs from other participants. A plan of action was formulated by the SRF commander, and departments and specialized teams were given directions. Unscheduled meetings throughout the exercise were conducted as the situation dictated. These meetings were useful for problem solving and coordination as well as formulation of directives. Participants varied as the task requirements varied. As the operation progressed, it was obvious that the decision to restrict the number of participants at the two scheduled meetings conducted by the SRF commander was necessary. The tendency for meetings to become unwieldy must be recognized. To gather, collate and disseminate information to higher authority, it was decided that two comprehensive OPREP-3 messages would be sent daily. One in mid-morning local time, the second after all major tasks for the day had been performed which was approximately one hour after local sunset. Other OPREPs were sent as dictated by the urgency of the situation. Gathering the information necessary to write the two major daily OPREP-3's was difficult in the early stages of the operation as inputs were often late and written in highly technical language. By D+2 most liaison officers were providing timely, well written inputs. Numerous one or two paragraph OPREP-3 messages were

sent as major tasks were accomplished throughout the exercise. The various specialized teams supporting the SRF commander were tasked by their parent organizations to make reports to their headquarters on their progress. By requiring these specialized teams to provide a copy of these reports to the SRF commander, coordination was greatly enhanced. In addition to record traffic daily phone conversations with both CINCLANTFLT and CNO duty officers were made and logged to keep them apprised of the situation and answer any questions.

(2) CONCLUSION: The information and decision making system described above proved satisfactory during the exercise. By D+2, lines of communication and coordination between supporting organizations within the SRF were well established and in operation. The exercise was brought to a successful conclusion, and higher authorities stated that they felt they were kept well informed throughout the exercise.

(3) RECOMMENDATIONS:

(a) Restrict the attendees of meetings to only those necessary to provide information and coordination in order to formulate direction.

(b) Provide specialized teams access to the SRF commander on an as necessary basis.

(c) Insist that specialized teams provide liaison officers to the SRF commander and that the liaison officers be responsible to provide timely, well written inputs to the Operations Officer for inclusion in the OPREP-3 reporting system.

(d) That specialized teams making reports to their parent organizations provide copies of the reports to the SRF commander via the Operations Officer.

(e) Send OPREP-3 reports as major changes occur in the situation. These comprehensive OPREP-3 updates should be sent twice daily.

e. Topic: Command Post Management

(1) COMMENT/DISCUSSION: Personnel assigned the Command Center were cooperative and well qualified. The noise level remained low until the voice circuits became "very" active. Circuit discipline was good throughout the exercise. Information display was adequate but could use refinements in size and frequency of updating of status boards. A locator status board of key personnel would have been beneficial. The Command Center was designated a limited access area and a guard restricted the movement of unauthorized personnel based on an access list provided by the Admin/Security Department of Port Gaston. All meetings were conducted in a room adjacent to the Command Center. Occasionally, "discussions" in the Command Center grew to be "meetings" and participants were requested to conduct their business elsewhere. The need for more support personnel, i.e., radio men, admin and status board keepers, became evident early on, while space also became a problem.

(2) CONCLUSION: The functions of the Command Center are to gather, provide and display information to the SRF commander, implement his directives and coordinate the efforts of the specialized teams. To accomplish this task, the Command Center must be a center of operations with

access limited to those who have a need to conduct business there. It must be of sufficient size to present all necessary visual displays and be adequately manned to keep those displays current.

(3) RECOMMENDATIONS:

(a) The Command Center needs to be designated a Limited Access Area and must be controlled.

(b) The voice circuits should be positively controlled and the area partitioned off to keep the noise level low.

(c) Develop and maintain a key personnel locator status board. Insist that liaison officers and point of contact personnel provide current information as to their location.

(d) Ensure there are sufficient personnel to man the Command Center. If in doubt as to the number of personnel, bring more rather than less.

2. RADIOLOGICAL SAFETY AND CONTROL

a. Topic: Interagency/Service Coordination

(1) COMMENT/DISCUSSION: Immediate SRF establishment of an effective Joint Radiological Control Center (JRCC) is of prime importance to ensure a well coordinated radiological control/radiological health response. In order to accomplish this, there is a need to know personnel/equipment capabilities of teams when they check into the site.

(2) CONCLUSION: When the Accident response Group (ARG) teams check in with the Personnel Support Activity (PSA), the ARG teams should furnish to PSA a listing of personnel, qualifications, and specific mission. In

turn, PSA should indicate the time and place of the initial JRCC meeting as established by the Senior SRF Radiation Health Officer (RHO).

b. Topic: Personnel

(1) COMMENT/DISCUSSION: The duties and responsibilities assigned to the SRF RHO to simultaneously coordinate and analyze data from the field, advise the SRF medical representative, SRF site restoration representative, On-Scene Commander, PAO and to chair the JRCC is too much for one person to handle.

(2) CONCLUSION: The SRF response to the radiological health problems could have been more effectively handled by two or three more health physics personnel.

(3) RECOMMENDATION: Provide three-four health physics personnel for SRF and let one chair the JRCC with the others assuming various other positions and reporting directly to the chairman of the JRCC. Three of the health physics personnel could participate in such tasks as data base coordination, bioassay studies, and site restoration.

c. Topic: Coordination

(1) COMMENT/DISCUSSION: Initially, many radiological control questions were directed to the Radiation Health Officer because of the inadequacy of training of the designated Radiological Controls Officer. This provided confusion at the OPS Center, Forward Command Post (FCP), and Contamination Control Station (CCS).

(2) CONCLUSION: Initially, as a result of less than positive direction provided by radiological controls personnel, erroneous information was used for decisions in masking and unmasking various personnel.

(3) RECOMMENDATION: The SRF have three-four Radiological Controls Officers with one advising the OSC and participating in the JRCC and the other Radiological Controls Officers reporting to him and directing the radiological controls at the FCP, CCS, and OPS Center.

d. Topic: Instrument Calibration

(1) COMMENT/DISCUSSION: In order to prevent any misunderstandings about field data collection, all radiac monitoring equipment needs to be calibrated in a uniform manner, prior to any group taking measurements.

(2) CONCLUSION: Unnecessary time was spent in analyzing how the Army RADCON Team calibrated their equipment in order to determine the validity of some of their data.

(3) RECOMMENDATION: Prior to any individual or team entering any area to conduct field measurements, the equipment should first be calibrated by a distinct group such as the HOT SPOT Team of Lawrence Livermore National Laboratories (LLNL).

e. Topic: Interagency/Service Support

(1) COMMENT/DISCUSSION: There was a tremendous amount of information pertaining to radiological health/controls passed among OPS Center, FCP, CCS, Navy Hospital, COV, and FEMA. Much of the information (air/water samples, status of casualties, evacuation recommendations) needed for critical decisions was not expeditiously received or analyzed.

(2) CONCLUSION: Slow and sometimes erroneous decisions were made because of lack of documentation of information passed from one point to another.

(3) RECOMMENDATION: Teletype circuits with computer interfaces should be located at OPS Center, FCP, CCS, Naval Hospital, COV, FEMA, DOE, etc. (A similar type system already exists and was in use with DOE, LLNL, Sandia National Laboratory, etc.) This will allow documentation of all information disseminated via telephone modem with scrambler attachment. Furthermore, the computer system should have a software package specifically developed for a nuclear weapon accident such that air, water, soil data can be input with results plotted in an appropriate fashion. It should also have the capability of drawing in isopleths, geographical data, grid coordinates, etc., for analysis and distribution to selected participants.

f. Topic: Radiological Emergency Medical Procedures

(1) COMMENT/DISCUSSION: Injured personnel who are contaminated with Pu²³⁹ need to be cared for in an expeditious manner in order to stabilize the injury and then minimize wound/internal contamination. In conjunction with this, early decisions need to be made on the use of chelating agents that bind with Pu²³⁹ in the body and reduce exposure to the individual's bones, liver, and spleen. Chelating agents such as Ca and Zn DTPA are not readily available since they are investigational drugs.

(2) CONCLUSION: The injured/contaminated individuals were expeditiously cared for and administered the proper chelating agents as a direct result of a knowledgeable representative of the Radiation Emergency Assistance Center/Training Site (REAC/TS) who brought these agents with him. However, REAC/TS is not tasked to respond to all nuclear weapon accidents; only those in a specific geographical location.

(3) RECOMMENDATION: REAC/TS respond to all nuclear weapon accidents and have available sufficient quantities of chelating agents to provide initial treatment for injured/contaminated personnel.

g. Topic: Monitoring Equipment (Survey)

(1) COMMENT/DISCUSSION: The specialized teams which responded to the accident exercise, i.e., Army RADCON, Air Force Radiation Assistance Team (AFRAT), etc., utilized advanced, if not the state-of-the-art, monitoring equipment to perform surveys of the affected area and perimeter.

(2) CONCLUSION: It took only a few hours for the Army RADCON Team and the AFRAT, including COV teams, to conduct a survey of the perimeter and determine the extent of the Radiation Control Area (RCA), and perform a detailed survey of the entire area. With the equipment presently available to the Navy RADCON teams, (AN/PDR-56 and AN/PDR-27), the same survey would have taken many days and would have resulted in most, if not all, of our RADIAC assets becoming inoperative before the arrival of the Air Transportable RADIAC Package (ATRAP) team.

(3) RECOMMENDATION: Provide the Navy's initial response teams with a minimum of two BROKEN ARROW Response Kits (BARKS) which would allow the IRF to perform a perimeter survey or a quick survey of the area for hot spots if required before the arrival of the Army RADCON Team. It is understood that this instrument is complicated to use and would require a highly trained operator. Navy RADCON teams have many technically oriented personnel and with proper training this should not be a problem.

h. Topic: Equipment Decontamination

(1) COMMENT/DISCUSSION: It had been considered that most equipment would not be decontaminated until all personnel were processed through the CCS, however, it soon became readily apparent that these personnel were going to wait on their equipment while congregating at the rear hot line continually inquiring about how long it will take to get their gear.

Example of these items are: personal respirators especially those with eyeglass inserts, Marine weapons, RADIAC equipment, and other specialized gear used by EOD/ARG teams and others.

(2) CONCLUSION: One area of CCS operations that was not properly considered was the capability to promptly decontaminate equipment brought to the CCS hotline by personnel returning from the PCA.

(3) RECOMMENDATION: Since these requirements would likely exist in a real world situation, it is recommended that provisions be made for establishing an adequate equipment decontamination facility within the CCS. This facility should be furnished with all suitable materials and supplies and manned by personnel knowledgeable in the proper, and varied, decontamination techniques for the many different kinds of items to be decontaminated. This function may require additional personnel assets to RADCON teams so as not to reduce the effectiveness of the personnel monitoring and decontamination stations. However, if it is considered that area surveys are/can be, best performed by the specialized assist groups due to their more sophisticated equipment, these personnel requirements and the training of RADCON teams might be channeled more toward this area of

equipment decontamination. This problem is not covered at any length in NET-OPS school, but should be; and it would be beneficial if an equipment decontamination facility was clearly depicted in Figure 7-2 of OPNAVINST 3440.15 as a requirement so it will not be overlooked.

i. Topic: Radiation Contamination Survey Techniques

(1) COMMENT/DISCUSSION: The Radiation Contamination Survey was slow to get started due to lack of guidance from the SRF RADCON Officer who was working in various areas. When an additional officer was assigned to RADCON and teams given specific areas to monitor, the evaluation progressed positively and smoothly. It is imperative that the RADCON Officer be utilized for RADCON/SURVEY only in order to maintain positive control over the RADCON situation.

(2) CONCLUSION: The U.S. Navy RADCON element could have provided area survey teams on a limited basis. The use of more capable groups such as Aerial Measuring (AMS) and the Army PADCON team provided for faster and more accurate survey data. Their use should be accepted as SOP, excepting of course the immediate needs dictated by the situation. PADIAC equipment used by the Navy is antiquated compared to instrumentation used by other service response teams; resulting in far slower, less accurate monitoring techniques.

(3) RECOMMENDATIONS: Shipboard personnel are not sufficiently trained for and should not be included in shore response forces. Recommend more face to face training with various command IRF/SPF RADCON teams. Recommend that a separate team be developed to provide plotting and surveying guidelines to allow for positive hot spot/contamination locations.

j. Topic: Equipment Decontamination

(1) COMMENT/DISCUSSION: The filter holders on MK 17 protective masks were easily contaminated making decontamination difficult due to lack of spare holders on hand. The carrying pouch for the mask proved to be a difficult decontamination problem because of the material being so porous.

(2) CONCLUSIONS: Basic monitoring equipment proved to be easy to handle and monitor, however decontaminating proved to be time consuming.

(3) RECOMMENDATION: Recommend many spare filter holders be available so mask may be reissued once the holder is exchanged vice turned in and drawn the following day after decontamination has been accomplished. Manufacture pouch out of a different material that contaminants will not adhere to and is easily washed/decontaminated.

5. COMMUNICATIONS

a. Topic: Interagency/Service Coordination

(1) COMMENT/DISCUSSION: Pre-exercise coordination and liaison was thorough and complete. As a result, equipment and publications were on site and in operation prior to the SRF arrival on the scene. In the event of an actual emergency, the SRF Communication Officer must be prepared to react to communications requirements by having available for a short notice deployment, the communications publications necessary to obtain and use such assets as commercial leased lines, satellite channels, and portable radios. The communications officer must also be prepared to make a rapid assessment upon arrival of what communications are available and what must be requested to support the recovery operations.

(2) CONCLUSION: During an actual contingency, prior coordination will not be possible. Therefore, close on-site coordination among communications personnel of the various services and agencies involved will be essential to avoid mutual interference and to allow maximum effective utilization of assets.

(3) RECOMMENDATION: That the Service Response Force Communications Officer be designated as the central coordinator for all on-site communications and that all services and agencies intending to operate communications at the accident site provide to him, on arrival, a point of contact, a list of communications assets on the site, and operating frequencies to be utilized.

b. Topic: Interagency/Service Support

(1) COMMENT/DISCUSSION: Communications support provided to the Service Response Force by the communications detachment from the First Marine Division was excellent. Record traffic volumes were low throughout the exercise, therefore the capacity of the USMC communications detachment was never taxed. The Nuclear Emergency Search Team (NEST) communications POD provided good quality video support for the Operations Center late in the exercise.

(2) CONCLUSION: The NEST POD would be a valuable asset during an actual incident.

(3) RECOMMENDATIONS: The NEST POD be requested early in the event of an accident.

c. Topic: Disparities between Current Directives and NARP.

(1) COMMENT/DISCUSSION: Section 7 of the NARP contains very limited descriptions of Marine Corps deployable communications facilities and no indication of any Navy deployable communications assets.

(2) CONCLUSION: Section 7 of the NARP is incomplete.

(3) RECOMMENDATION: Update Section 7 of the NARP to include all deployable communications assets available from within the Department of Defense, their capabilities, and the correct procedures for requesting deployment of those assets.

6. SECURITY

a. Topic: Marine Security Force (MSF)

(1) COMMENT/DISCUSSION: IRF and SPF Marine Security Force personnel had virtually no prior nuclear weapons accident/incident training prior to NUWAX-83 and required extensive training and briefs upon arrival at NOF, Port Gaston.

(2) CONCLUSION: Marine Security Force personnel performed admirably considering the various units involved and the lack of prior training. However, the exercise would have gone even smoother if the Marine Security Force had come from a Naval Weapons Station Marine Barracks.

(3) RECOMMENDATION: That Marine Security Force be drawn from Naval Weapons Station Marine Barracks. These Marines are trained in nuclear weapons movements, the use of deadly force, and the various concepts of nuclear protection. Additionally, these Marines would already have the proper security clearances and be members of the Personnel Reliability Program.

b. Topic: Security Perimeters

(1) COMMENT/DISCUSSION: The OPNAVINST 3440.15 requirement that the security perimeter surrounding the accident scene shall be a minimum of 2000 feet from the accident site plus additional distance on the down-wind side of the accident plus an additional 1000 yards if the accident occurs external to Federally controlled property is unrealistic.

(2) CONCLUSION: The security perimeter distances established in OPNAVINST 3440.15 might be feasible in rural areas; however, the establishment of a 5000 foot NDA in heavily populated areas could result in access control to the accident scene becoming an impossibility.

(3) RECOMMENDATION: That security perimeters be established by the On-Scene Commander. The distances will be based on weapon fragmentation distances, reports of weapon conditions, local terrain, population, and location of crash site.

c. Topic: Check-in Procedures/Security Clearances

(1) COMMENT/DISCUSSION: Many personnel (IRF, SRF, DOD, DOE, etc.) participating in the exercise failed to check in with Visitor Control upon arrival, which resulted in incomplete security/entry lists thus creating an extra workload at the Field Command Post. Also, personnel responding to the accident failed to either forward or hand carry their security clearances and Personnel Reliability Program (PRP) certification in accordance with OPNAVINST 3440.15. Again, this caused numerous problems for Visitor Control and Field Command Post security personnel.

(2) CONCLUSION: In the event of an accident, the immediacy of the situation overrides the requirement for an immediate FFP verification but

still requires an appropriate security clearance or lengthy briefing/debriefing sessions. All personnel must check-in with Visitor Control in order to expedite entry to the areas for which they have a "Need to Enter."

(3) RECOMMENDATION: The importance of hand carrying security clearances (electronic verification can be obtained later) in accordance with OPNAVINST 3440.15 and proper check-in procedures must be emphasized and reemphasized to all personnel.

7. CASUALTY HANDLING/MEDICAL

a. Topic: Interagency/Service Coordination

(1) COMMENT/DISCUSSION: The multiple agencies and Service teams having expertise, which was brought to bear in handling nuclear accident casualties, do not routinely work together or interface. This notwithstanding, the experts from these various teams quickly made themselves available to the SRF Medical Coordinator and allowed themselves to be quickly integrated into the action.

(2) RECOMMENDATION: More exercises and CPX's would be of value.

b. Topic: Interagency/Service Support

(1) COMMENT/DISCUSSION: Interagency/Service support was excellent.

(2) CONCLUSION: None

(3) RECOMMENDATION: None

c. Topic: Disparities Between Current Directives and NARP

(1) COMMENT/DISCUSSION: None

(2) CONCLUSION: None

(3) RECOMMENDATION: None

8. WEAPONS OPERATIONS

a. Topic: Interagency/Service Coordination

(1) COMMENT/DISCUSSION: Both EOD Detachments and the DOE/ARG arrive on the scene of an accident with individual talent, experience, and hardware that traverses a spectrum from simple to exotic. The problem in the past has been to meld these numerous assets together in an integrated and coordinated manner. Additionally, a chain of command for information flow to the On-Scene Commander with proposed action, clearly delineating the issues associated with weapons recovery, was wanting.

(2) CONCLUSION: An initial meeting of DOD and DOE/ARG upon the latter's arrival is essential to brief the problems and establish an integrated team organization with good two-way communications and a chain of command pipeline link to the On-Scene Commander.

(3) RECOMMENDATION: The senior EOD officer establish a chain of command organization as soon as possible integrating DOD and DOE/ARG into the command and control organization of the On-Scene Commander. This was done effectively in NUWAX-83 as outlined in EOD Weapons Recovery Organization below. It is noted that senior ARG representatives assigned the experts on the systems to be recovered by their background in fuzing/firing, warhead, HE, etc. All hazards, influences, circumstances,

and potentials were discussed. Issues were delineated and a mutually agreed upon plan of action was formulated down to the smallest detail. The plan was presented in the evening meetings in preparation for the next operational phase where the larger body had a chance to ask questions. The agreed upon plan was briefed to the On-Scene Commander by the senior EOD officer for approval. All deviations found necessary in the field had to be cleared back through Weapons Recovery Control Center. It is recommended this type of format be utilized for future exercise/real world, realizing as in all emergency situations a degree of flexibility must exist.

EOD WEAPONS RECOVERY ORGANIZATION

EOD/WPNS RECOVERY

SENIOR ARG COORDINATOR

FOR WEAPONS RECOVERY

LINE ITEM 87 WPNS

LINE ITEM 100 WPNS

RECOVERY GROUP

RECOVERY GROUP

SPECIALIZED TEAM

SPECIALIZED TEAM

COMBINED OF NAVY

COMBINED OF NAVY

AND ARG PERSONNEL

AND ARG PERSONNEL

b. Topic: Interagency/Service Support

(1) COMMENT/DISCUSSION: Both interagency and interservice support during the exercise was adequate. The DOD and DOE weapons organizations came with the necessary equipment to do the job. Additionally, DOE had the labs standing by as well as NEST assets to provide for any eventuality. DOD

had all its supporting forces on alert both in the logistic channels and the NAVEODTECHCEN for technical/material EOD support. Only the artificiality of the exercise caused logistic problems with respect to following Nevada Test Site regulations on Anti-C wear, handling equipment, prestaging packaging containers, etc. It is noted that because of the personalities involved, available resources were known for the most part, but this may not always be the case. There was no listing of available support equipment, who had it, and where specifically it could be found.

(2) CONCLUSION: Although interagency and interservice support proved to be adequate during NUWAX-83 there were shortcomings as to personnel assets, known equipment/services availability.

(3) RECOMMENDATIONS:

(a) DOE/ARG should have a "shopping list" of available equipment/services it can offer to enhance weapon recovery operations. Similarly, EOD should provide a list and brief of additional specialized resources it has in alert at NAVEODTECHCEN, Indian Head, MD.

(b) Make all DOD aware of Record of Assembly (ROA) on weapons. These are held at Pentax and include MC and serial numbers for positive I.D. of all weapons components.

(c) A four man EOD Detachment, as used in this exercise, is not large enough to handle all aspects of initial entry/recon/communication to field and forward/rear command post as well as interrogating personnel who were on-scene (such as firefighters) for essential information. Recommend those EOD teams designated with nuclear response be manned with at least five personnel.

(d) In the area of intra-agency support, it is highly recommended that during weapons recovery operations, EOD teams be given priority through hotline. A color coded arm band would provide easy identification.

c. Topic: Disparities Between Current Directives and NARP

(1) COMMENTS/DISCUSSION:

(a) OPNAVINST 3440.15N requires radiac instruments to be packaged prior to proceeding into an accident site. This makes the instruments harder to use and not as reliable. The instruments are easily decontaminated with tape, water, or brushing off of the Alpha contamination.

(b) Contingency press releases in both DOD Directive 5230.16 and OPNAV 3440.5 include sentence "there is no danger of nuclear explosion." (This release was sent out during NUWAX-83 prior to EOD declaring all systems safe.)

(2) CONCLUSIONS:

(a) Leave the packaging of radiac instruments and equipment of the EOD team to the discretion of the EOD OIC.

(b) On-Scene Commander's staff check with EOD prior to release.

(3) RECOMMENDATIONS:

(a) Add paragraph (d) to OPNAVINST 3440.15N to read, "The packaging of radiac instruments and equipment of the EOD team is to be determined by the EOD OIC."

(b) Review releases once again to ensure public is informed but information will not pose later embarrassment.

d. Topic: Render Safe Procedures

(1) COMMENT/DISCUSSION: Render safe procedures were carried out in accordance with applicable SWOPs B57-6 and W55.43-6. These publications provide the specific guidelines necessary for safing and recovery of each nuclear system. While the render safe procedures were carried out with success in NUWAX-83, some deficiencies became apparent and were discussed at Sandia National Laboratory in mid-June 1983 by ARG and DOD personnel.

(2) CONCLUSION: A thorough review of SWOPs B57-6 and W55.43-6 needs to be conducted. As an extension, the need to review publications governing older weapons systems still in inventory should be evaluated.

(3) RECOMMENDATIONS:

(a) Bring together DOE/ARG and EOD personnel from NUWAX-83 at Sandia to conduct review of publications B57-6 and W55.43-6 in light of recent experience. Specifics for consideration are:

1 Utilizing X-rays needs study relative to its value as an EOD tool. As a result of X-ray, what EOD action would be modified in render safe procedures? What safety considerations need to be taken into consideration for its use? Should there be a library of X-ray photos of weapons in mint condition for comparison? What credentials are required for operators? What time frames can be anticipated for set-up, shooting, and developing?, etc. Use should be noted in SWOPs.

2 A better foaming system needs to be developed for immobilization of HE and components. Foam requires better flow/sweep characteristics and slower setting time to permit good penetration. Useable applicators for dispensing should be part of kit.

3 Better pictorial display of weapon system component parts relative to one another as well as individual shots of key components are required in SWOPs. (Source data photos provided by DOE/ARG were immensely better.)

4 Indexing of Table 7-3 by major assembly, subassembly, and component parts would permit unclassified reporting.

5 As a security matter, consideration of satellite overflights needs mention in SWOPs to reduce high resolution photography intelligence gathering opportunities.

e. Topic: Recovery and Salvage

(1) COMMENT/DISCUSSION: Once the weapons and their associated classified hazardous components are recovered, the salvage operation is straightforward with PENTAX packaging and DOD weapons personnel preparing transfer documentation and travel. Recovery operations will need to be tailored to each scenario encountered; however, there are some considerations that are universal and are expressed below as lessons learned under recommendations.

(2) CONCLUSIONS: See recommendations.

(3) RECOMMENDATIONS:

(a) A critical decision point is the recovery of all classified components since it directly affects maintenance of NDA. The dilemma that arises if all components cannot be found is whether to keep searching, and for how long, or can missing items be declared demilitarized by DOD/DOE experts thereby being accounted for? Lessons learned are:

1 A good grid search plan is essential.

2 Utilize large scale chart/map.

3 Serial numbers of components obtained through the Record of Assembly (ROA) are a must, particularly if two similar systems are involved.

4 Utilize experienced searches and have DOE components experts standing by for positive identification.

5 Evaluate dispersal pattern of weapon explosion to ascertain high probability search areas. As a corollary - dispersal patterns of tested weapons systems could be put into data bank and computer enhanced with accident overlays to predict search areas and anomalies of component flight.

6 A data bank of pictures showing key components in mint condition and after explosion would be extremely helpful as well as what components would be reduced to non-entities.

9. Topic. Public Affairs

a. Interagency/Service Coordination

(1) COMMENT/DISCUSSION: Pre-exercise meetings with the principals from each participating agency gave a full understanding of roles and intended procedures. This early consensus was further demonstrated, in terms of the Joint Information Center (JIC) operation, by two jointly released memoranda concerning the need for everyone's participation in coordinating press releases and how each agency should assist in improving

the flow of information from source to release. While these are only small examples, they illustrate the coordination/cooperation as each agency responded in unison to the demands of the exercise. (One sample memo is attached for information.)

(2) CONCLUSION: While all agencies represented in the JIC worked well together, firm leadership and formal procedures are required to ensure that all press releases (and applicable responses) are fully staffed and coordinated prior to release. Almost all releases, no matter how elementary, have some impact on every agency involved. Therefore, mutual concurrence is mandatory.

(3) RECOMMENDATION: DOD Directive 5230.16 (Nuclear Accident and Incident Public Affairs Guidance), in paragraph F.2.f., states that "Activities of the Community Emergency Action Team (CEAT) shall be coordinated through the senior FEMA official (SFO)....". This is proper, in that DOD does not have jurisdictional authority over state/local governments. However, it should be clearly spelled out that final direction of CEAT activities is approved by the agency having current control over the Joint Information Center.

b. Interagency/Service Support

(1) COMMENT/DISCUSSION: Pre-exercise meetings established what the Navy and other agency PAO's should furnish in the area of administrative support and these items were provided. Reproduction and telecopier capability in the JIC and Navy Headquarters was absolutely crucial in providing timely information and rapid feedback both within the on-scene

infrastructure and externally to remote participating organizations. FEMA provided some handheld radios which gave an extra link to the widely scattered players. FEMA contributed greatly to the JIC by providing a word processor that speeded the final product through endless revisions necessitated by coordinating material through all players. Complete audiovisual assets were simulated during NUWAX-83. For real world internal and external public affairs these assets would be critical in maintaining credible press relations.

(2) CONCLUSION: It is doubtful that a typical naval weapons station could adequately handle the support requirements leveled at it during the early phases of an accident/incident of this scope. The PAO office tasked with being the service response force would not have on-hand an emergency response kit capable of meeting administrative and communications needs applicable to an accident of this scope.

(3) RECOMMENDATION: Assets, be they personnel or equipment, must be dedicated and on-hand. Assembly after-the-fact of items such as Xerox or telecopier is doubly difficult in the confusion generated by an accident/incident.

c. Topic. Current Directives

(1) COMMENTS/DISCUSSION:

(a) While the NARP provides some guidance, there appears to be no cleared-for-public-release information available to any DOD activity on the subjects of radiological contamination (various types at various levels) or general information addressing nomenclature, basic mission and handling of special weapons.

(b) Although PAOs on the line may meet basic needs of media, the availability of technical and operational experts to meet with reporters and community leaders is critical to public understanding of events at hand and moreover what we are doing about them.

(2) CONCLUSION: Effort must be expanded now to overcome these deficiencies in order to ensure effective public affairs performance in the future.

(3) RECOMMENDATIONS:

(a) Although the NARP is designed to be a comprehensive single source booklet which explains total emergency response capabilities/assets among federal agencies in a crisis event, it should include: names and phone numbers of headquarters and regional staff offices, description of organizational relationships within the federal systems, general capabilities of people and equipment and recommended methods for requesting their assistance.

(b) A cleared for use booklet or reachable source who can be contacted during crisis events ought to be available to those in need of pertinent information.

SAMPLE MEMO

NUWAX 83 JOINT INFORMATION CENTER RELEASE PROCEDURES

From: JIC Coordinator

To: All Agencies Participating in NUWAX 83 JIC

Subj: News Release Procedures

1. Before any material not already covered in a previous release or press conference is provided to the media, the following procedures will be utilized:

- a. Staff info within your own organization for complete accuracy.
- b. Make enough copies for each participating agency to chop and cross check information with their key contacts. (This will normally take at least 30 minutes. All Public Affairs personnel should attempt to do this as rapidly as possible, however.)
- c. All chop copies will be returned to initiating agency with any corrections and initials of reviewing person.
- d. Initiating agency will make any changes (or resolve any discrepancies).
- e. Initiating agency will then make at least one copy for each agency, twelve copies for press, and five copies for JIC admin (Navy enlisted) personnel.
- f. JIC admin personnel will then file the initial copies and the final release (stapled together for each release) on a master release board in JIC. They will then deliver the twelve copies to the press center and staple one copy of the release on the wall of the press center in chronological order. Releases will be sequentially numbered based on the last release number on the master outgoing release board.

2. The cooperation of all public affairs personnel is appreciated. If Jefferson County is not represented in the JIC, it will be the

responsibility of the COV to ensure use of these procedures for local staffing/releases.

Dale E. Smith

LCDR USN

DOD JIC Coordinator

10. Topic: LOGISTICS AND SERVICE SUPPORT

a. Interagency/Service Coordination

(1) COMMENT/DISCUSSION: From the SRF standpoint interagency/service coordination was outstanding. The high level of coordination was the direct results of months of planning and personal contact between the various organizations involved in setting up the exercise. In a "real world" situation, however, there will not be time to establish this same level of advance coordination. The Navy team will need to rely on well established logistical operating procedures; that is logistical support procedures that are common knowledge to both support and user personnel. During the exercise the SRF Supply Officer was not required to order significant quantities of material, as required material was pre-positioned prior to the exercise. In a real world situation the SRF Supply Officer will use both MILSTRIP and contract methods to obtain required material, equipment and, in some cases, berthing and messing facilities. The SRF Supply Officer will need maximum flexibility to accomplish this mission.

(2) CONCLUSION: The use of NAVSUP P-485, Afloat Supply Procedures, provides the SRF Supply Officer with the tools required to accomplish his

mission with a maximum of flexibility. Additionally, under Afloat Procedures (para 3080) the senior Supply Officer is, by virtue of his position, a contracting officer.

(3) RECOMMENDATION: CINCLANTFLT should designate the SRF as an afloat unit, and authorize the SRF to use afloat supply procedures.

b. Interagency/Service Support

(1) COMMENT/DISCUSSION: Interagency/service support during the exercise was outstanding. Real world support, however, depends on the ability to obligate the government to pay for needed supplies, equipment, and services. This can only be done if the SRF Supply Officer has funds with which to operate. During the exercise the SRF Supply Officer requested an initial funding of \$1,000,000.00. CINCLANTFLT augmented the SRF's supporting military base, NOF Port Gaston, operating budget by passing the SRF funds to COMNAVBASE Norfolk who passed the funds to NOF Port Gaston. The accounting system used was the standard shore accounting system. In a real world situation the SRF Supply Officer should be directly funded. Additionally, the SRF Supply Officer will most likely have enlisted storekeepers doing the actual ordering of material and OPTAR accounting. These storekeepers are familiar with fleet accounting procedures (NAVSO P-3013), but normally are not familiar with shore accounting procedures. Additionally, in order for the SRF to order materials using the MILSTRIP system, the SRF must have an established Unit Identification Code (UIC). During the exercise the SRF support activity, NOF Port Gaston, ordered all SRF requirements using their UIC. In a real world situation on the SRF

Supply Officer will need his own UIC to order material independent of a supporting military activity. This is especially true if the SRF is stationed some distance from the closest military activity.

(2) CONCLUSION: The SRF should be funded using NAVSO P-3013 procedures. The SRF should be assigned as UIC.

(3) RECOMMENDATIONS:

(a) CINCLANTFLT fund the SRF using NAVSO P-3013 procedures.

(b) CINCLANTFLT should request the assignment of a "V" series UIC for the COMNAVBASE Norfolk SRF.

c. Administrative Support

(1) COMMENT/DISCUSSION: When individual orders were cut ordering player personnel to the exercise site, a shore type procedure was used. CINCLANTFLT required each activity sending personnel to the exercise to cut orders. To accomplish this end, CINCLANTFLT sent funds to each command to cover the per diem and transportation costs. This approach was cumbersome at best. In a real world situation there will not be time to follow this approach.

(2) CONCLUSION: A more responsive order issuing system must be established.

(3) RECOMMENDATION: CINCLANTFLT issue individual sets of blanket TAD orders to key personnel of the SRFs at the start of each fiscal year. The orders should cite CINCLANTFLT Tango numbers. In the event of an accident, the individual members will simply activate the orders after funds are provided by CINCLANTFLT.

d. Transportation Support

(1) COMMENT/DISCUSSION: During the exercise the SRF Supply Officer was not required to transport personnel or material to or from the accident site. In a real world situation the SRF or supporting activity supply officer will have transportation requirements. In order to fund these transportation requirements and control the expenditure of accident funds, the assignment of a unique CINCLANTFLT Transportation Account Code (TAC) is required.

(2) CONCLUSION: The SRF Supply Officer must have access to a TAC code.

(3) RECOMMENDATION: CINCLANTFLT should designate a specific TAC Code to fund accident related material transportation requirements.

e. Base Camp Facilities

(1) COMMENT/DISCUSSION: Base camp support facilities at the exercise were outstanding. In a real world situation, should the accident take place in a location that would require setting up a field camp, the SRF would need to be augmented with personnel familiar with constructing a field camp. The exercise base camp material was supplied by a Naval Construction Battalion Unit, not the Air Force as proposed in the NARP.

(2) CONCLUSION: The SRF should have a construction battalion unit assigned to construct a base camp if the need arises.

(3) RECOMMENDATION: CINCLANTFLT should assign a Construction Battalion Unit the responsibility of providing the required material and personnel to construct a base support camp.

f. Disparities between Current Directives and NARP

(1) COMMENT/DISCUSSION: The NARP calls for the support element to provide the Accident Response Force with berthing and messing. This is a correct assignment. However, during the exercise the Food Service Officer was required to collect monies for the sale of meals to officers and civilians. In a real world situation collecting money for individual meals while under field conditions is impractical. Additionally, the probability that personnel will arrive at the accident site with sufficient funds to carry them through an extended period is unlikely.

(2) CONCLUSION: The collection of monies for individual meals is impractical.

(3) RECOMMENDATION: CINCLANTFLT should authorize personnel assigned to the accident team to subsist in the mess at no cost to the individual. The cost of subsistence items should be paid with O&MN funds vice MPN funds.

11. Topic: LEGAL AFFAIRS

a. Interagency/Service Coordination

(1) COMMENT/DISCUSSION: The officer that attends meetings with state or other federal agencies must be very aggressive and alert to pursue and protect the interests of the Navy. Once the agencies are initially put on notice that we mean business, it is difficult to keep the initiative.

(2) CONCLUSION: The foregoing assumes that we are to portray an organization that means business and intends to be aggressive in pursuit of what it sees as the proper thing to do under the circumstances. None of the

applicable directives make clear how we are to approach the situation as a matter of philosophy.

(3) RECOMMENDATION: It should be made clear as a matter of policy how higher headquarters want the SRF to approach the situation. An aggressive "can-do" attitude is a markedly different matter than a low-key "we are here to make everyone happy ASAP" attitude.

b. Terminology

(1) COMMENT/DISCUSSION: Attempts to ensure that everyone is using words in the same meaning will materially reduce confusion. An example is the word "casualty." The term was sometimes used to include dead and injured and sometimes to mean only dead and sometimes to mean only injured.

(2) CONCLUSION: Confusion is the greatest problem that can be solved by prior planning. Ensuring that all terms of art are understood the same way ahead of time will reduce confusion.

(3) RECOMMENDATION: Applicable directives should contain terms and definitions for use by all members of the SRF.

c. Lines of Communication

(1) COMMENT/DISCUSSION: Basic lines of communication must be specifically established between the various elements of the law enforcement and security community and from the legal office to a central information point. One incident that occurred never materialized into play because of a lack of communications between the Marine guards, NIS, Facility Security, and the Service Response Force legal office.

(2) CONCLUSION: Without better coordination between the law enforcement and security communities, the potential for considerable embarrassment exists.

(3) RECOMMENDATION: Modify the basic directives to provide for the creation of Joint Law Center, to operate much like the Joint Information Center, which will facilitate the exchange of information where it is generated. Therefore, it would be located near the NDA until its collapse, at which time the JLC would be located at a location convenient to all member agencies.

d. Interagency/Service Support

(1) COMMENT/DISCUSSION: As a basic legal team, a claims officer and the staff Judge Advocate from Commander Naval Base, when added to the legal staff of the affected facility, comprise a unit having the skills needed to meet the issues following an accident. Additional officers should be added based on workload as necessary. Two enlisted members of the pay grade E-6 or above are basically sufficient with additional personnel a function of workload.

(2) CONCLUSION: The legal team of the SRF is satisfactory for initial operations. Additional officers for claims investigation will need to be added based on the judgement of the legal officer as to the number and complexity of claims to be received.

(3) RECOMMENDATION: The exercise of judgment by the SPF legal officer in this regard should be anticipated by its being noted in the applicable directives.

e. Environmental Law

(1) COMMENT/DISCUSSION: Environmental law expertise is required to permit the SRF legal office to make an appropriate contribution to the effort.

(2) CONCLUSION: Access to environmental law expertise should be provided.

(3) RECOMMENDATION: Environmental law becomes a factor in the successful prosecution of a site restoration plan. Environmental law is not a discipline normally pursued by a staff judge advocate in light of the mission of the Office of the General Counsel (OGC). Authorization for liaison between the Staff Judge Advocate and members of the OGC sufficient to provide legal support in the area of environmental law is recommended.

f. Ambiguity

(1) COMMENT/DISCUSSION: One place where the JAG Manual is not as clear as it could be is in the sections that assist one to decide whether a given situation, about which few facts are known, is one within the Federal Tort Claims Act or the Military Claims Act.

(2) CONCLUSION: Clarification is required in this area which is one of policy.

(3) RECOMMENDATION: Claims issues require considerable discussion to determine whether to process claims under the Federal Tort Claims Act (FTCA) or the Military Claims Act (MCA). No claim which is payable under the FTCA can be paid under the MCA. The MCA authorizes advance payments, while the FTCA does not; so the MCA has a great appeal to a disaster scenario.

However, no guidance exists in the JAGMAN to state whether the claims officer should presume negligence (therefore pay much later under FTCA) or lack of negligence (therefore make advance payments under MCA) in a case where few facts are known and the existence of negligence cannot be determined pending a lengthy investigation. The JAGMAN should tell the claims officer whether to apply res ipsa loquitur should it be otherwise appropriate to the situation.

12. Topic.: SITE RESTORATION

a. Interagency/Service Coordination

(1) COMMENT/DISCUSSION: A site restoration task group was formed on 5 May, D+1, to address this subject area. FEMA assumed the lead in this group and chaired all of the meetings. The three principal players were FEMA, COV, and Navy. A total of six meetings were held during the next five days to plan restoration actions and discuss claims procedures.

(2) CONCLUSIONS:

(a) The site restoration task group was too large to be an effective working body. The number of attendees varied from 17 to 27 participants plus umpires. Some of the participating agencies had no direct input to the group and therefore no requirement to be present. Also some agencies changed representatives several times; thus hindering continuity in the planning effort.

(b) The task group must establish and use to the fullest, functional area sub-groups with experts in each field. Two such sub-groups were formed but not fully utilized. The sub-groups formed were to prepare a

Radiological Survey Plan and establish cleanup standards. The sub-groups did not provide written recommendations to the task group with details and facts. Additional sub-groups could be formed for areas such as environmental considerations, legal aspects, restoration procedures, and disposal procedures.

(c) Leadership within the task group must be strong and directive in nature.

(3) RECOMMENDATIONS:

(a) Membership of the site restoration task group be limited to one or two representatives from the following agencies:

Military Agency (SRF)

FEMA

State and/or local government

DOF/ARG

EPA

Air Force CDCE

DNA Accident Advisory Team

Other Federal or state agency which owns property affected by the accident

Membership must also include at least one health physics or radiological safety expert to provide current information on RADCON efforts, plans and plots.

(b) The site restoration task group must have current accurate information on areas and levels of contamination. A single composite source with information from all survey teams must be established.

(c) The site restoration task group should advise the radiological survey coordinator of data needed by the task group to accomplish restoration.

b. Interagency/Service Support

(1) COMMENT/DISCUSSION: Interagency support is required for the restoration planning process because many separate agencies provide radiological survey data. The COV response group was very knowledgeable and helpful in this area but this is likely not to be true from other states. It has been observed that states without nuclear power plants have limited capability to respond to nuclear accidents. The Army RADCON Team and the Air Force Contamination Disposal Coordination Element (CDCE) would likely play a larger role in non-nuclear power states.

(2) CONCLUSION: State Emergency Services Organizations need a better understanding of the roles and responsibilities of the military department involved in site restoration.

(3) RECOMMENDATION: CINCLANTFLT provide information to all State Emergency Service Organizations, in their geographical area, on the Navy's role in nuclear weapons accident/incident scenarios.

c. Decontamination

(1) COMMENT/DISCUSSION: Decontamination procedures were discussed at great lengths by the task group but always in general rather than specific terms. Two factors precluded determination of specific decontamination procedures. The dominant factor was a lack of detailed radiological data covering the entire area of contamination. Survey data

available during the course of the exercise was very limited and assumptions had to be made as to the probable extent of contamination in areas such as building interiors, exteriors, roofs, etc. Experimentation would be necessary to determine the effectiveness of various options, i.e., can a surface be washed or must it be packaged and removed to an approved storage area. The second factor causing great difficulty is the lack of an established or agreed upon cleanup standard. What level of radiation presents an acceptable health risk? Opinions varied between 0.2 microcuries per square meter, advocated by EPA to 1.0 microcuries per square meter. Much time was spent debating what survey techniques were necessary to measure 0.2, 0.6, 1.0 etc. With a background reading of 0.2 why should cleanup be required to 0.2?

(2) CONCLUSION: The radiological survey data lacked credibility. Every discussion by the experts, and there were many, involved some divergency of opinion on technical points such as instrument settings, instrument capabilities, survey techniques, etc. Some of the credibility problems were due to the lack of understanding of terminology by players.

(3) RECOMMENDATIONS:

(a) A cleanup standard in a useable form such as microcuries per square meter must be established/adopted by the Federal government for use by all concerned.

(b) A grid system covering the entire area of suspected contamination must be established early in the exercise and used to provide common points of reference for all survey data.

d. Restoration Plan

(1) COMMENT/DISCUSSION: A copy of the draft site restoration "plan" developed by the task group is provided as Attachment 1 to this section. This document is very general in most respects and is not a definitive plan with actual decontamination procedures. It is based on speculation as to radiation levels and describes procedures used in previous restoration actions. The enclosed document is probably the best that can be expected from an ad hoc committee operating under emergency field conditions.

(2) CONCLUSION: A more realistic approach to developing a site restoration plan must be tested. The committee approach was not satisfactory.

(3) RECOMMENDATION: A site restoration plan should be prepared by an engineering firm with more expertise in this area and with assistance from DOE and DNA. If the expertise to prepare such a plan exists within DOE or some other Federal agency, that agency should take the lead in preparation of a plan. The SRF does not have this capability.

CONSIDERATIONS FOR SITE RESTORATION OF PORT GASTON, VIRGINIA

PURPOSE:

To address the problems associated with radiological contamination resulting from the U.S. Navy CH-46 helicopter crash at the Port Gaston Naval Ordnance Facility on May 5, 1983, and the ensuing detonation of the high explosive portion of a nuclear weapon being carried by that helicopter.

SCOPE OF PLAN:

This plan addresses all land and facilities which have received radiological contamination as a result of the crash on May 3, 1983, in the area of Port Gaston, VA.

This plan addresses actions to clean up or otherwise prevent health hazards to the citizens of Port Gaston, VA. These actions include measures brought to bear due to the contamination of the air, soil, water, vegetation, livestock and other animal life, buildings, food production facilities, etc. This plan includes provisions for the long-term monitoring of the air, soil, water, and locally produced foodstuffs by the U.S. Environmental Protection Agency. Actions under this plan require compliance with the provisions of NEPA. This plan does not address the resolution of any legal claims from citizens of Port Gaston for personal injury, financial losses, etc.

CURRENT STATUS:

All casualties resulting from the crash and other causes were identified and removed from the site as quickly as possible consistent with the safety of emergency response personnel.

The National Defense Area, established by the Navy On-Scene Commander following the crash, has been dissolved, and control of this area has been returned to state and local authorities.

The contaminated area has been identified. More sensitive instruments, which require more time-consuming methods, will be employed to more precisely define this boundary. An air monitoring program has been

initiated and will continue to be used to safeguard the health and safety of workers during the recovery program, as well as future occupants of the area.

RESTORATION ACTIONS:

1. Decontamination will be accomplished in two phases. Phase one, initial decontamination, which will encompass approximately 33 acres and 100 buildings, will involve decontamination of all areas which have radiation readings of 20 microcuries per square meter or higher. Decontamination actions include:

a. Construction of earth dams at the confluence of surface drainage features to create settlement basins.

b. Removal of topsoil and surface vegetation to a depth of about six inches, or to greater depth if required to achieve radiation readings less than 20 microcuries per square meter. The estimated quantity of soil is 28,000 cubic yards.

c. Remove and shred all vegetation.

d. Scrub and wet vacuum all paved surfaces.

e. Wash exterior walls of all buildings.

f. Fix contamination on roofs.

g. Decontaminate and remove all personal property with a value greater than \$300.00 which can be decontaminated. Displaced citizens will be requested to provide an inventory of household items meeting the above criteria. This will include items such as cars, boats, and television sets. Personal items of great sentimental value will be considered on a case by

case basis. It should be noted that the extent of contamination may determine which items may be retrieved.

2. The Department of Energy is taking the lead on locating an appropriate disposal/long range storage site, and is arranging for utilization of that site. Identification of a disposal site will be made by May 17, 1983.

3. Phase two, long term cleanup, which encompasses an additional 20 to 30 acres and approximately 100 additional houses, will involve decontamination of all areas having radiation readings above a reading 0.2 or 0.6 microcuries per square meter. The exact value will be consistent with capabilities of monitoring equipment. Extensive additional surveys are necessary, to define the extent of the 0.2 and/or 0.6 microcuries per square meter isopleths. The time frame for accomplishment of these surveys is not yet available. Phase two will employ the same decontamination procedures with two notable additions:

a. All roofs will be removed and replaced.

b. The interiors of all buildings must also be surveyed in detail and decontaminated as necessary.

4. An alternative to decontamination of individual houses would be acquisition by the Navy of the entire area to be decontaminated and all structures thereon. This option could involve demolition and removal of all buildings to an approved storage area rather than attempting to decontaminate them. The weather and wind conditions at the time of the accident have probably resulted in extensive contamination within many buildings.

5. A detailed comparison of the alternative Phase Two costs is beyond the capabilities of the site restoration planners. Purchase of the property by the Navy for uses other than residential, i.e., less than full time habitation, would, based on current legislation, reduce the requirement for long term monitoring and preclude the potential for future claims against the government. This course of action may therefore be attractive.

6. The Navy will prepare an Environmental Assessment in accordance with the National Environmental Policy Act for submission and review by all concerned. LANTNAVFACENGCOM estimates 3 to 5 months for preparation of an Environmental Assessment and 9 to 18 months for an Environmental Impact Statement.

7. The CNO will coordinate action with the Council on Environmental Quality to obtain authorization to proceed with the initial decontamination phase prior to filing of an Environmental Assessment.

8. The recommendations in this plan will be reviewed by higher authorities in all concerned agencies. This review process will include public hearings for input by private citizens.

APPENDIX 3 TO ANNEX A TO JOINT DOD/DOE/FEMA VOLUME II AFTER ACTION REPORT
COMMANDER IN CHIEF, U.S. ATLANTIC FLEET (CINCLANTFLT) AFTER ACTION REPORT
LESSONS LEARNED

1. COMMAND AND CONTROL

a. Topic: Public Affairs

(1) COMMENT/DISCUSSION: Early release of information in coordination with State officials considered mandatory. Confirmation of nuclear weapons by initial OSC to State and the press at the earliest time is essential if public is to be properly informed and protected. Truth is essential to maintain credibility.

2. LEGAL AFFAIRS

a. Topic: National Defense Area (NDA)

(1) COMMENT/DISCUSSION:

(a) We need to remedy without delay the current lack of specific law (statute, Executive Order, U.S. Attorney General opinion) for NDA's outside Federal installations. Exercise play in 1981 and 1983 has unequivocally established this serious deficiency and we should take care of it before a real-life situation occurs.

b. Topic: Claims

(1) COMMENT/DISCUSSION: Advance payment for claims is not definitively established by Navy directives. Even though other relief agencies can help out in time of personal loss from disaster, provision should be made by Navy to make advance payments upon a proper showing. In the case of a nuclear weapon accident (or other incident resulting from a Navy instrumentality) the Navy has a moral obligation for prompt financial help, and the public relations aspects of advance payments could be very beneficial.

ANNEX B TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT
ARMY AFTER ACTION REPORT LESSONS LEARNED

1. This annex contains comments submitted by the Army Radiological Control Team (RADCON) on NUWAX-83.

2. COMMENTS: The RADCON Team arrived on site approximately 12 hours after notification of the BROKEN ARROW. The On-Scene Commander (OSC) was briefed by the RADCON Team Leader as to resources and capabilities. The following day attempts were made to integrate the Army RADCON Team (RT) into the overall radiological control activities of the exercise, but there was no designated individual who controlled or directed those activities. Therefore, the RT developed a plan to conduct the initial ground survey which was subsequently briefed to the OSC, and received his approval for it to be conducted once the EOD activities had been completed. The RT procedural doctrine states that the RT will NOT perform surveys inside the safe keep-out distance for the known weapons or a 610 meter radius circle of an unknown weapon until those weapons have been rendered safe. This particular restriction on RT activities needs to be re-evaluated and a new philosophy of EOD/RT efforts must be investigated. The point of such a re-evaluation would be to reduce the time to obtain data on the extent of the contamination pattern. Perhaps a detailed coordination of combined EOD/RT efforts would allow the determination of such information while minimizing any hazard to RT personnel. During the afternoon of 6 May 83 before the weapons were actually rendered safe, they were administratively assumed safe so that the RT could perform two specific missions, one of

which was to locate a radiologically clean area adjacent to one weapon for the EOD to perform some of their operations. It should be pointed out that had that been a real situation, the RT would not have performed those missions until the weapons were actually safe. However, the RT recognizes the need to perform radiological surveys during the extended time for weapon safing and, therefore, recommend that a new philosophy of EOD/RT efforts be investigated.

On 7 May 83, the initial ground survey mission was accomplished. However, because of the extent of the contamination, the eastern most limit of the contamination was not defined on this initial mission. Results of the survey were briefed to the OSC, and RT recommendations for follow-on missions were also made to the OSC who promptly approved them. Two things should be pointed out at this time:

(1) By this time, a single point-of-contact had been established for radiological operations but there was still no integrated coordination among the various agencies; this was done on an individual basis.

(2) The initial ground survey plan was developed based on the data supplied by the Aerial Measurement System (AMS) which was extremely useful for planning purposes. However, because of the nature of the contamination pattern and the capabilities of the AMS, the AMS did not indicate the extent of the contamination in the easterly direction. Therefore, it is recommended that the AMS be considered as an extremely useful technique but should not be considered a substitute for the ground survey.

As the exercise progressed and the radiological surveys proceeded according

to the RT developed plan, the interaction of the various radiological agencies became more organized with evening meetings being held to discuss daily results and the following day's activities. It became evident from both the individual agency interactions and the group discussions that there is a strong need to establish coordinated activities of the DOD/DOE/FEMA/STATE (where practical) emergency teams relative to instrumentation, calibration techniques and operational procedures. Although all the Agencies used the required calibration procedures and there was agreement of the results obtained by the various agencies, there was an artificiality to calibration procedure (as a result of the simulant) that would not have existed if the contaminant was real Pu. The BRL intends to indicate a seminar (or series of seminars, if necessary) to develop, at least, DOD/DOE agreed upon radiological procedures. The development and publishing of such procedures would allow their implementation on a common basis by all radiological response organizations. By the time the exercise was terminated, the radiological working group was an active and coordinated one.

It became apparent that, at least from the RT point of view, that the play was dominated by the DOD and DOE elements with little interaction of the FEMA or the state taking place.

It is felt that future exercise should allow these latter two organizations to play stronger roles. Also, it is strongly recommended the NARP be modified and adopted by DOD, DOE, and FEMA. It is recognized that the NARP is a dynamic document, continually being changed to reflect the lessons learned through the NUWAX events; nevertheless, such a published

accepted document provides the necessary information to all agencies as to how they will fit into the accident response organization, how they will function, who they will be responsible to and what they can expect in the way of support.

Perhaps a way to streamline the implementation of the NARP organization and procedures would be to establish a professional cadre of experts in the various areas required to field an effective responsive force. These individuals would constitute the OSC's staff for their respective areas. This approach would assure that no matter what the location or situation for an accident, there would always be the best qualified people available to direct the necessary operations.

A few final comments relative to RT operations are:

(1) The movement of the RT laboratory trailer from the A&E building to the hot line was handled extremely efficiently and quickly as was the necessary generator and power connection operations.

(2) The RT FIDLERs were all equipped with Ludlum model No.2220 electronic packages which proved to be trouble-free (zero failures were experienced and high voltage drift was essentially non-existent), extremely easy to electronically and radiologically calibrate, and its digital read-out eliminates the uncertainty that accompanies the interpretation of dual logarithmic scale of the PRM-5.

(3) In a prolonged operation, which would probably be the case for a real accident, it is clear that additional manpower would be required to continue to accomplish necessary radiological operations. Even though the

exercise lasted only 5 days (RT participation), it was clear from the intensity of the radiological missions that even the younger team members were showing signs of fatigue. For a real accident situation, consideration will need to be given to rotating or replacing teams on a regular basis.

(4) The RT laboratory trailer is a necessity at an accident location. The instrumentation available in the trailer provides for gamma spectral analysis, liquid scintillation counter (for monitoring swipes) and several proportional counters. The data obtainable from these instruments would be critical inputs for the development of a site restoration plan, and would provide data necessary to confirm the type and level of contamination.

ANNEX C TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT
AIR FORCE AFTER ACTION REPORT LESSONS LEARNED

This annex contains comments submitted by two Air Force Agencies. Appendix 1 is a comment by the Air Force Air Transportable RADIAC Package (ATRAP) and Appendix 2 consists of comments by the Air Force Contamination Disposal Coordinating Element (CDCE).

APPENDIX 1 TO ANNEX C TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT

AIR FORCE AIR TRANSPORTABLE RADIAC PACKAGE (ATRAP) AFTER ACTION REPORT
LESSONS LEARNED

Radiological Safety and Control

Topic: Equipment Deficiencies

(1) COMMENT/DISCUSSION: The Alpha Detectors (Model AN/PDR 56) used during the exercises were found to contain a design deficiency. The cable assemblies on the radiac sets were found to be picking up unwanted radio interference causing erroneous readings on the meter.

(2) CONCLUSION: The Government (Navy) specification used in the manufacture of the AN/PDR 56 Sets did not require all wire conductors to be shielded. The present cables contain five wire conductors, two shielded and three unshielded. The lack of shielding on the remaining wires allows the radio interference at 145.000 MHz and at higher frequencies. ATRAP personnel modified one of the radiac sets by installing a shielded cable and the problem disappeared.

(3) RECOMMENDATION: The radiac sets should be modified to contain shielded cables. NOTE: Mr. Moore, USAF Item Manager at Kelly AFB, Texas, has already been notified of the problem and is in the process of initiating a work order for testing of a new cable assembly to use with the AN/PDR 56 Sets.

APPENDIX 2 TO ANNEX C TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT

AIR FORCE CONTAMINATION DISPOSAL COORDINATING ELEMENT (CDCE) AFTER ACTION REPORT LESSONS LEARNED

1. COMMAND AND CONTROL

a. Topic: Interagency/Service Coordination

(1) COMMENT/DISCUSSION: Difficulty was experienced by the CDCE during the first 24-48 hours in obtaining information regarding the accident situation, who was in charge of site restoration, and meeting times of key working groups.

(2) CONCLUSION: Improvements in communication between responding agencies is necessary to insure effective response and maximum use of resources.

(3) RECOMMENDATIONS:

(a) Organize and announce a location to brief arriving support teams on actions and situations as soon as possible.

(b) Status board - Post all locations and times of meetings.

(c) OPR Bulletin Board - List key organizations and personnel.

b. Topic: Disparities Between Current Directives and NARP

(1) COMMENT/DISCUSSION: Paragraph 15-4b(2) of the NARP identifies the USAF CDCE as having specialized training in contamination disposal. The definition is misleading and could cause a reader to understand that the CDCE is a specially equipped team capable of actual site restoration. This is not the case. The CDCE is capable of providing civil engineering advice/guidance, arranging for USAF Special Assignment Airlift Missions (SAAMs) and identifying various containers for contaminated materials. The

words "specially trained" should be deleted.

2. LOGISTICS AND SERVICE SUPPORT

a. Topic: Transportation Support

(1) COMMENT/DISCUSSION: Transport of recovered weapons/components was performed by simulated DOE Safe Secure Trailers. The CDCE offered C-141 SAAM support on two separate occasions; on both occasions the support was declined.

(2) CONCLUSION: In the real world situation the public attention and maximum weapon exposure caused by shipping damaged weapons across nine states (VA to Amarillo, TX) by truck could be easily averted by a 4-hour flight by C-141.

(3) RECOMMENDATION: Post-accident movements of weapons and components should be accomplished by the safest and most expeditious manner to insure security of the weapons/components and minimize public exposure.

ANNEX D TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT
DEPARTMENT OF ENERGY (DOE) AFTER ACTION REPORT LESSONS LEARNED

1. This annex contains comments submitted by the Department of Energy (DOE) on NUWAX-83.
2. Appendix 1 consists of comments submitted by the Senior Site Restoration Umpire and the NUWAX-83 Site Restoration Plan.

a. Topic. Weapons Recovery - Materials/Components Identification

(1) COMMENT/DISCUSSION: Identification and proper disposal of damaged nuclear weapons and associated delivery system debris/component parts at an accident site is necessary for several reasons: (1) to assure that all hazardous materials/components are secured as a part of accidental termination process, (2) to assure that materials/components which are classified for national security purposes are recovered and protected, (3) to facilitate return of real property contained in the secured area from national government control to original agency control by assuring that all government property has been removed. Because accidents are fundamentally problematical by nature, conditions of materials/components cannot be predicted in advance. On site identification is complicated by the often difficult field environment in the contaminated area (e.g., with protective masks and clothing) and a reasonably controlled environment is critical for accurate determinations.

(2) CONCLUSION: Accurate identification of weapon materials/components after their exposure to extreme environmental insults attendant to accidents, requires a thorough knowledge of design details of the specific items involved. This in practice requires participation by DOE

weapons design laboratories' personnel.

(3) RECOMMENDATION: Qualified DOE weapons design laboratories' personnel should be available just outside of the "hot line" to advise DOD search team personnel on identification of materials/components when they encounter unclear evidence and request aid.

b. Topic: Weapons Recovery Reporting - Use of Accurate Terminology

(1) COMMENT/DISCUSSION: Use of technically accurate terminology in messages which describe nuclear weapons hardware or operations during accident recovery is essential to avoid potentially serious misinterpretations or misleading information in message traffic to and from the field operations. Terminology used in the EOD and health physics communities, which has become highly standardized over the years and is contained in applicable DOD/DOE Joint Nuclear Weapons Publication System documents, is especially critical. To illustrate, the notion of "safing" can apply to the earliest action taken to stabilize the accident by insuring that no source of active electrical power is available to the weapons' electrical subsystem or just to wait a prescribed period (the correct term is Emergency Procedures), the subsequent action to assure that the nuclear weapon is in the prescribed electrically safe condition (the correct term is Render Safe procedure (RSP) of the Nuclear System is complete), and to the final actions which prepare the damaged weapon for shipment to a disposal site (the correct term is Continuation of RSP is complete). The proposed term could have been ambiguous; for example, implying that the weapons high explosive subsystem had been intentionally detonated at a single point. It could be taken to mean completion of RSP for the Nuclear System. Similarly,

a message from the field correctly reported "high order detonation" of weapon - - a term which refers to response of the weapon's high explosive only.

Persons not familiar with this usage viewed the accident event as a "low order detonation," since there was no significant nuclear contribution to the HE yield. Depending on the specific nuclear weapon type involved, the distinction between high and low order HE Detonation is critical to correct estimation of the details of Plutonium disposal.

(2) CONCLUSION: Use of technically correct terms in message traffic is essential to the avoidance of misunderstandings which can lead to completely erroneous conclusions.

(3) RECOMMENDATION: All messages leaving and entering the field operations center should be screened for technical accuracy by a weapons knowledgeable specialist on the DOE/ARG Team.

c. Topic: Assessment of Weapons Status - Recording Data

(1) COMMENT/DISCUSSION: Of vital importance in an accident situation is the initial assessment of the condition of the weapons by the advance reconnaissance team. Personnel may be under the pressures of working in a high radiation environment, public view or a variety of other things. It is very difficult to assess the overall picture and keep all of the facts memorized until much later when the reporting is done. We found that many of us had concentrated on the same obvious problems and had overlooked other information.

(2) CONCLUSION: Relying upon memory or trying to take written notes while in "anti-C" clothing is very inefficient. A better way of managing this early information is needed.

(3) RECOMMENDATION: That the ARG Team procure cameras and some type of tape recording gear to record the accident field data. A team member should then be trained to inspect the unit and objectively describe everything he sees for future analysis. This procedure would be particularly good for documenting serial numbers and other stenciled data.

d. Topic: EOD Render Safe Procedures - Radiographic Capabilities.

(1) COMMENT/DISCUSSION. EOD manuals are written to cover various degrees of Render Safe Procedures (RSP), depending upon the condition of the weapon. They do not, nor should they try to, address in a general way all of the special cases where high explosives (or other critical components) may be damaged. An important tool in analyzing the extent of damage is radiography. Radiography techniques, in the hands of trained personnel with intimate knowledge of the weapons designs, can be a very effective tool for determining the safest method of performing RSP.

(2) CONCLUSION: It is important that DOD EOD teams are made aware of the radiographic capabilities that are possessed by the ARG elements.

(3) RECOMMENDATION: That future revision of the EOD manuals include a description of the radiographic capabilities of the ARG teams and a description of how these assets may be used to diagnose accident caused damage.

e. Topic. ARAC - Availability and Use of ARAC Data and Capabilities.

(1) COMMENT/DISCUSSION: ARAC involvement went well and provided very useful information both on the extent and magnitude of the accident contamination. ARAC coordinated weather data provided on-site weather

station data (via USWB-Las Vegas) and performed surface and upper air measurement. The Navy also provided upper air data. The coordination of collected field radiation contamination data so that it is centralized, and available to all, needs to be better coordinated. Considerable confusion existed as to sharing and centralizing of radiation field survey data. However, the standardized use of common units, microcuries of plutonium per square meter, eliminated any possibility of units confusion for comparison purposes.

(2) CONCLUSION: There still appears to be confusion among various agencies; military, state, and Federal as to the resources available to them through ARAC. As a result, ARAC was not as fully utilized initially (after arriving on the scene) as it could have been. However, after ARAC plots and services were made available to the various agencies, ARAC was called upon to supply considerable supplemental information, such as the fixing of deposited material to reduce resuspension, dose estimates to personnel due to resuspension, magnitude of cleanup effort, etc., and were often approached directly by the Navy on a one-to-one basis for advice. Overall, this aspect of the exercise went well, considerably better than NUWAX-81 where there were extensive problems, and confusion, with radiological units.

(3) RECOMMENDATION: Provide, through applicable nuclear weapon accident manuals and training, increased information on the full range of ARAC capabilities.

f. Topic: Explosives Ordnance Detachment (EOD) - Operations

(1) COMMENT/DISCUSSION: EOD procedures were generally adequate and well executed. Close working relations between Livermore and Los Alamos scientists and the EOD team were developed. In addition, equipment and communications were shared as needed. However, during the exercise, a series of steps taken by the EOD were questioned by the Livermore weapons team. Of particular note, Livermore suggested additional safety precautions involving flushing an inlet area with an inert gas before performing a nuclear safety assessment.

(2) CONCLUSION: Procedures governing EOD operations could be improved. In particular, EOD manuals for line item 87 need revisions to clarify procedures and add appropriate precautionary items. This could be accomplished by a joint EOD/DOE laboratory task force.

(3) RECOMMENDATION: Recommend DOE review the current method for determining the safe condition of a line item 87 unit and revise EOD manuals as appropriate. Include a high explosives expert as part of the DOE/ARC laboratory response element.

8. Radiological Safety/Environmental Monitoring

a. Topic: Health Physics Management

(1) COMMENT/DISCUSSION: On D-day, the On-scene Commander requested radiological support from Service assets. Also on-scene on D-day were a number of civilian agency assets, requested by the State. The On-scene Commander's Radiation Health Officer and the DOE Offsite Technical Director (OSTD) met on the evening of D-day to develop a management plan to

coordinate all of the assets. The plan was announced on the morning of D+1 to representatives from USEPA, Center for Disease Control (CDC), FEMA, OEHL(USAF), AFRAT, RAMT, Commonwealth of Virginia, DOE/RAP, On-scene Commander's staff, and DOE/ARG. The management/coordination of field activities was assigned to the DOE/RAP team. Data Base management was assigned to the Virginia EOC. Later, a team was established to provide data analysis and evaluation. Despite this planning and organizational effort, the radiological/environmental monitoring resources did not coordinate well until late in D+2. The press of weapons play appeared to overshadow the radiological/environmental issues in NUWAX-83, and in fact play ended when the damaged weapons were packaged and shipped.

(2) CONCLUSIONS:

(a) Service and civilian radiological/environmental monitoring resources came to NUWAX-83 with strong internal allegiances and fixed charters which took some time to restructure and coordinate into an appropriate response unit for NUWAX-83. The off site radiological/environmental monitoring coordination role assigned to the DOE by 44CFR351 and implemented in the Federal Radiological Monitoring and Assessment Plan (FRMAP) had not been coordinated with other Federal agencies or the State. The distinction between "on-site" and "off-site" in a nuclear weapon accident is probably inappropriate because with the disestablishment of the National Defense Area, the total accident site becomes "off-site." Coordination between the Nuclear Weapon Accident Response Plan (NARP) and the FRMAP on this point is needed. Early planning and a strong command

structure to efficiently use the responding organizations' capabilities is necessary. Colocation of the Joint Radiological Control Center (prescribed by the NARP) and the Federal Radiological Monitoring and Assessment Center, FRMAC, (prescribed by the FRMAP) was successfully accomplished during NUWAX-83. Location of the FRMAC within a controlled access area was advantageous.

(b) With the packaging of the damaged weapons and components and the disestablishment of the NDA, the weapons related constituency of the ARG prepared to depart Port Gaston. At this point, the scope of ARG responsibilities shifted to concentrate primarily on technical support/coordination of the radiological/environmental monitoring program. A parallel shift probably should occur at DOE/HQs, with EP assuming subsequent responsibility for continued coordination of DOE actions at the HQs level. The rationale, procedures, and strategies for these shifts have not been defined. The resources needed by the OSTD are different from those deployed in support of the EOD effort. In fact, the standard ARG deployment is inadequate to support the DOE's obligations under the FRMAP. As noted under subtopic (b), some technical deficiencies arose because of a lack of expert technical support. Although the LLNL HOTSPOT team did an outstanding job, there was too much for that team to do. Staffing of the FRMAC with individuals from the various radiation teams may not be the best approach - - an all DOE staff is worthy of further consideration. It is concluded that DOE should be prepared to support the FRMAC with a team of at least six individuals reporting to the DOE/OSTD to manage the off site radiological/environmental monitoring and assessment program.

(c) DOE was never tasked by FEMA, in accordance with the FRMAP, to coordinate the offsite radiological monitoring and assessment program during NUWAX-83. The DOE/OSTD recognized the lack of organization in the NUWAX-83 radiological monitoring and assessment program, and proceeded to establish the FRMAC as a mechanism for task management. The NUWAX-83 radiological/environmental monitoring program under FRMAC was established to:

1 Assist the on-scene commander in accounting for any radioactive material dispersed in the accident. This is needed to assure that no large, classified shapes of nuclear material remain accessible to members of the public after disestablishment of the NDA.

2 Assist the on-scene commander in preparing a site restoration plan.

3 Assist the public health agencies in taking appropriate protective actions.

4 Provide the basis for a long-term environmental monitoring program.

(d) To achieve these objectives the DOE/OSTD established the FRMAC with the following functional areas and task management responsibilities:

1 Data collection (field measurement program - responsible for planning and coordinating the total data collection program including in situ radiation measurements, water sampling, air sampling, and biological sampling and analysis.

2 Data base management - responsible for receiving, collating, sorting, displaying, and checking field measurement data.

3 Data evaluation and assessment - responsible for reviewing data base for internal consistency, recommending quality control measures, performing evaluations and syntheses on the data base, and recommending appropriate actions regarding any aspect of the public health and environmental situation.

(3) RECOMMENDATIONS:

(a) Revise the NARP and the FRMAP to assure a coordinated military, Federal civilian, and state response to radiological emergencies. Include the following:

1 Implementation of FRMAP requirements in the NARP, and vice versa, as applicable.

2 De-emphasis of "on site" and "off site" distinctions to assure completeness and continuity in radiological/environmental monitoring program.

3 Colocation of military, Federal civilian, and state/local radiological/environmental monitoring operations centers in a controlled access area.

4 Objectives and basic outline of radiological/environmental monitoring plan to serve as basis for detailed plan that would be developed for each accident situation.

(b) All radiological/environmental monitoring organizations responding to an accident site must report to the joint radiological/environmental monitoring operations center for coordination and instructions.

(c) Accident response organizations should review their charters to assure that there is adequate flexibility to allow rapid coordination with health physics management planning and structure at the scene of an accident.

(d) DOE should develop a FRMAC team deployment plan, independent of, but coordinated with the Albuquerque ARG. A task management and staffing plan for the FRMAC team should be included. The task management plan developed for NUWAX-83 is recommended for implementation by the DOE. The FRMAC team should include several expert advisers, such as a REAC/TS member, and an environmental scientist. In describing the function of the DOE/OSTD, the word "coordinate" should be replaced by "manage."

b. Topic: Radiation Measurements - Equipment Requirements/Capabilities

(1) COMMENTS/DISCUSSION:

(a) Instrument calibration. The primary instrument used for assessing the deposition of weapons plutonium on soils in situ is the FIDLER. It was recognized early on that in order to merge all FIDLER data into a common data base, it would be necessary to calibrate all instruments to a standard radiation source. The FIDLER instruments brought to NUWAX-83 by the various responding radiation teams were not intercalibrated.

(b) Locating measurements. In order to translate in situ radiation measurements into radiation isopleths, it is necessary to establish the exact location of each measurement on a map of the contaminated area. Most of the teams that came to NUWAX-83 were not properly equipped to fix the location of each field measurement. Some valuable time was lost in trying to verify previous measurements.

(c) The AMS product. The radiation teams that responded to NUWAX-83 generally were caught up in the rush to make field measurements and took no time to critically assess the AMS product and the limitations both in resolution and sensitivity of the AMS detector/analyzer system. As a result, most teams were misled into thinking that the extent of the AMS isopleths accurately represented the "footprint" deposited on the ground.

(2) CONCLUSIONS:

(a) Instrument calibration. The LLNL HOTSPOT response element recognized the need for intercalibration of FIDLER instruments and encouraged all teams to bring their instruments to the HOTSPOT laboratory where an intercalibration fixture with a Standard Am-241 source was available. Use of this service also was recommended during the nightly health physics meetings, and all teams ultimately took advantage of it.

(b) Locating measurements. Only the U.S. Army RADCON team came prepared with surveying equipment (transits) and stakes so that measurement locations could be accurately fixed and marked. The other radiation teams were forced to rely on existing roads or on compass headings which provide only an approximate location fix. The availability of laser rangefinding equipment was judged to be essential to an adequate field measurement program.

(c) The AMS product. Although a representative from EG&G presented a discussion of the product and the parameters associated with its preparation, too little critical review of the representation made by the AMS isopleths was made. It should be noted that the LLNL ARC product

(Calculation 3) was a more accurate representation of the "footprint." Most teams regarded the aerial photos (minus the isopleths) provided by EG&G as essential data for conducting ground surveys.

(3) RECOMMENDATIONS:

(a) Instrument calibration: All radiation teams should establish and use a common instrument intercalibration service before beginning a field measurement program.

(b) Locating measurements: Each field radiation measurement team should be equipped with location fixing and marking equipment. A laser rangefinder is recommended. The LLNL HOTSPOT team suggested that, in rough terrain where straight-line sighting along the ground is impractical, tethered balloons be located to provide reference fixes.

(c) The AMS product: for plutonium dispersion accidents, the ARAC fallout product is probably a more accurate representation of ground depositions, particularly in the downrange areas, than is the AMS isopleth map. Accordingly, it is recommended that the AMS product be viewed critically in plutonium dispersion accidents, and that its chief use should be to confirm the orientation of the "footprint" ("which way did it go") and to estimate surface radioactivity concentrations close to the source.

(d) Artificiality of NUWAX-83: All field radiation measurement teams should be reminded that an actual plutonium dispersion accident would leave a footprint on the order of 12-15 km in length under the meteorological conditions defined for the NUWAX-83 scenario.

(e) The AMS mission: EG&G should consider providing aerial photos with a UTM grid superimposed to the on-scene commander as early as possible to facilitate the early identification of surface features that may need prompt attention (residences, water courses, etc.) and to aid in the early development of ground survey and environmental monitoring programs. The EG&G capability is outstanding, and should be deployed promptly.

(f) Overlay of ARAC isopleths: Consideration should be given to providing aerial photos with ARAC-generated isopleths superimposed to the on-scene commander in a plutonium dispersion accident.

(g) Use of LLNL ARAC and HOTSPOT: These DOE assets provided outstanding service, and early deployment is highly recommended.

c. Topic: Radiation Measurements - Radiological Safety/Environmental Monitoring Program

(1) COMMENTS/DISCUSSION:

(a) Air sampling program. A comprehensive, systematic air sampling program was not established during NUWAX-83. The air sampling that was accomplished was sporadic, lacked quality control, was not quantitative, and the data lacked corrections for burial losses and background.

(b) Use of contamination fixative. Early in NUWAX-83, the DOE resisted using contamination-fixing agents because the existing air sample data indicated only background activity and because relatively mild meteorological conditions prevailed. Use of fixing agents is recommended by the NARP. Also, the LLNL HOTSPOT team presented calculations obtained from their resuspension model that predicted significant downwind airborne

activity and inhalation doses for individuals in the resuspension plume, even under the prevailing mild weather. Accordingly, DOE subsequently concurred in the application of a contamination fixative, albeit with strong misgivings.

c. REAC/TS deployment. REAC/TS provided a valuable service by assuring appropriate measures were taken to protect the health of potentially exposed individuals.

(2) CONCLUSIONS:

(a) Air sampling program. Air is the primary exposure pathway following a plutonium dispersion accident. A measurement program to quantify the radioactive material in this pathway deserves as much attention as the in situ soil contamination measurement program.

(b) Use of contamination fixative. The relative benefits of applying fixative as a matter of course are not clear. In some cases, use of an oil-based fixative could complicate future actions. For example, decontamination of structures could be made more difficult if fixatives were applied. Waste and residue disposal also presents a potential problem. Hydrocarbon materials (oils) in intimate contact with alpha-particle-emitting materials undergo radiolytic decomposition. This process generates hydrogen and other gases which can pressurize waste storage containers. A research program is needed to establish early resuspension factors in various meteorological conditions for various surface conditions so that the value of applying fixatives can be addressed. Secondly, that program should identify and recommend fixatives more appropriate for specific applications.

(c) REAC/TS deployment. REAC/TS is a resource needed by the DOE/OSTD as a part of the FRMAC team, and should be deployed with the FRMAC team.

(3) RECOMMENDATIONS:

(a) The DOE/OSTD, as director of the FRMAC, should assure that a comprehensive air sampling program, with appropriate quality control, is established promptly.

(b) The DOE should task SNLA to develop quantitative data on resuspension and application of fixatives. It is suggested that experiments could be conducted in a wind tunnel/containment system using actual plutonium oxide, particle diameter less than 20 micrometers, deposited on various kinds of surfaces, and disturbed by air streams having a variety of flow characteristics.

(c) A REAC/TS staff member should be deployed with the FRMAC team.

9. COMMAND AND CONTROL

a. Topic: ARG/EOD Communication - ARG Forward Command Post

(1) COMMENT/DISCUSSION: Although the informal communication between the ARG and EOD teams at the hot line was very productive and this type of communication should be encouraged, it would have been useful to have established a forward ARG command post with communications back to the DOE team leaders. This post could also serve as a field meeting place for the ARG team members.

(2) CONCLUSION: In situations where the main DOE command post is remote from the accident scene, formal communications are very difficult and may require that critical time be wasted in conveying messages to keep the main command post informed.

(3) RECOMMENDATION: In situations where a command post is remote from the accident site, a formal ARG post should be established near the EOD teams for the purpose of maintaining vital communications with the DOE team leader. This should in no way diminish the informal interactions between the ARG and EOD teams at the accident site.

b. Topic: Integration of ARG Assets - Command and Control Procedures

(1) COMMENT/DISCUSSION: Following deployment of the initial ARG contingent, the ARG is supplemented by laboratory and other DOE assets, as required by the dictates of the specific accident, and requested through DOE/JNACC. These assets are dispatched from various, and dispersed, home stations and arrive by either air or ground transportation, or a combination of both. As a result, arrival of assets is, by nature, staggered. During NUWAX-83, the ARG was not always provided estimated times of arrival (ETA) for the various incoming organizations/assets, causing some confusion as to when assets would be available. In addition, the reporting organizations in some cases did not know where to report, while others elected not to report to the ARG-TL as the first order of business upon arrival.

(2) CONCLUSION: The situation described above is one which can contribute to confusion and hamper the ability of the ARG-TL to effectively

integrate and manage DOE assets. Following approval of a request for call up of a particular asset, DOE/JNACC should provide the ARG-TL the ETA for the asset. In addition, the person in charge of the requested asset should contact the ARG-TL at the earliest possible opportunity. ARG elements must understand they are under the operational control of the ARG-TL.

(3) RECOMMENDATION: Modify the command and control sections of appropriate manuals to direct that all DOE assets immediately report to the ARG-TL upon arrival at the accident site. Formalize a procedure for JNACC to provide the ARG-TL the ETA of any requested asset.

10. COMMUNICATIONS

a. Topic: Radiological Team Liaison

(1) COMMENT/DISCUSSION: Radiological Teams arriving at NUWAX-83 in some instances neglected to report to the DOE/OSTD for liaison and coordination. As a result, some DOE assets were not utilized fully. There was no central communication system by means of which all DOE assets could be reached. As a result, some needs, especially in the area of technical advice, frequently went unmet. The DOE/ARG team leader did not receive a briefing from the DOE/RAP team leader regarding the off-site situation upon the ARG's arrival.

(2) CONCLUSION: In order to assure a coordinated offsite effort, it is necessary that all Federal radiological teams report, and describe their capabilities, to the DOE/OSTD at the earliest possible time. A central communication system available to all Federal radiological teams is

needed. Separate DOE/ARG and DOE/FRMAC teams are needed to provide a comprehensive response. A briefing by the first on-scene DOE team leader to the DOE/OSTD upon arrival of the FRMAC team is needed.

(3) RECOMMENDATION: Instruct all Federal radiological teams to report and describe their capabilities to the DOE/OSTD as soon as possible. DOE should consider developing a communications package to support the radiological/environmental monitoring activities managed by the DOE/OSTD. Formal procedures for passing responsibility from one DOE official to another should be developed.

b. Topic: Intra-ARG Communications

(1) COMMENT/DISCUSSION: Throughout the history of NUWAX exercises, communications available to the ARG at the accident site have proven inadequate. Although many aspects of this problem were corrected for NUWAX-83, the overall situation is considered unacceptable from an ARG perspective and much improvement is considered to be required. This assessment applies to the organization and identification of communications assets, equipment, and procedures. Of most important significance: communications between the ARG Command Post to the accident site were insufficient due to the inadequate range of the personal walkie-talkies in the possession of the ARG; the ARG ability to utilize Navy communications was prevented due to incompatible frequencies; and, a means to procedurally coordinate and integrate intra-ARG communications as well as the communications of all NUWAX federal participants (Navy, FEMA, DOE, etc.) was

lacking. Existence of such conditions significantly degrades command and control and lengthens the time necessary for the ARG to perform its mission. It is noted that the innovativeness and determination of the ARG communications personnel contributed substantially to minimizing the adverse effects of this situation during NUWAX-83.

(2) CONCLUSION: A high priority of DOE/AL planners should be the development of systems and procedures, and the procurement of equipment, to provide the ARG with adequate electronic communications.

(3) RECOMMENDATIONS:

(a) Acquire/develop a field deployable radio system which would be, ideally, man portable, light, easy to use and possess sufficient range to assure voice communications: from the ARG-TL (while at the CP or in the field) to all ARG team members when deployed in the field; and between all ARG elements in the field.

(b) Create a procedure for the OSC to establish a communications working group consisting of a representative of each organization involved and chaired by the OSC's communications chief.

(c) Provide for a communications coordinator as a regular member of the ARG.

(d) Require the OSC appropriate staff to provide a briefing and written information to all personnel (or to the ARG communications coordinator) concerning the features and capabilities of the serving telephone system.

(e) Require each entity that comprises the ARG to report upon arrival at the accident scene, in writing, to the ARG-TL or his representative, all communications capabilities they have available to them.

(f) Deploy CATCOMS, or a system like CATCOMS, with the ARG in order to transmit requests for actions and assets, reports, and to provide a hardcopy record of events.

(g) Provide the ARG/JNACC telephone link with a scrambler capability for classified messages.

(h) Pre-position communications equipments (standby made) at AL in suitcase form to permit immediate deployment with the ARG. A desirable feature would be a simple scramble system to use as necessary for transmitting classified messages.

11. LOGISTICS

a. Topic: Logistics/Security Operations - Equipment/Procedures

(1) DISCUSSION/COMMENT: Preparatory to NUWAX-83, the ARG attempted to identify and provide for all logistical requirements which could be anticipated. The purpose in so doing was to be as well prepared as possible upon arrival at the accident site, and to minimize the time spent on logistics not directly associated with accident operations. As part of this effort, the ARG utilized a fly-away kit containing needed clerical supplies, reference documents, and other miscellaneous items. Additional items of a similar nature were also taken in small boxes. Certain items, however, due to weight or size, were to be supplied by the Joint Task Group (JTG). The

JTG was also responsible for making arrangements for personnel billeting, messing, etc.

(2) CONCLUSION: Upon arrival, it was apparent to the ARG the JTG had anticipated ARG deployment as check-in for logistical purposes went smoothly. Office space had been predesignated and ample furniture provided. Other supplies were readily available, to include typewriters. Two items of particular importance, however, were not available: (1) a map of appropriate scale and type of the accident site and surrounding area; and (2) a safe for the storage of classified documents. The ARG had been told by DOE/JNACC personnel that both of these items were to be provided by JTG on-site. It should be noted that the ARG was eventually provided a safe on the second or third day, after many requests. Given the classification sensitivity of the documents involved, appropriate storage is a very important requirement.

(3) RECOMMENDATION: It is recommended that prior to deployment, DOE/AL make available to the ARG appropriate scale topographic (relief) maps of the accident area and provide the ARG with a vehicle (van) which would be fitted with an approved classified information repository. In addition, strengthen procedures which require the OSC to provide necessary field security force monitoring throughout the evening hours. If the van were outfitted with sleeping accommodations, an ARG team member, if necessary, could provide a continuous security presence. Such a van could also serve a valuable role in addressing certain of the communications problems dealt with elsewhere in this report. Use a DOE contractor organization (such as

EG&G/NEST) to serve a "front role" to deploy immediately to an accident site to arrange for lodging, vehicles, and other logistics requirements. Include a NEST logistics coordinator as a member of the ARG staff.

b. Topic: ARG Logistical Preplanning - Documentation Availability

(1) DISCUSSION/COMMENT: The logistical requirements associated with the deployment of the ARG are extensive. How well logistical requirements are satisfied can have a direct bearing on the performance of the ARG in the field. Because logistical arrangements are time consuming, the potential exists that accident operations as performed by the ARG could be negatively impacted.

(2) CONCLUSION: DOE/JNACC should preplan and provide for as many logistical requirements as possible in order to reduce the logistical burden of the ARG upon arrival at an accident site. In addition, the ARG should have in its possession all necessary reference documents and materials.

(3) RECOMMENDATION: Provide the ARG Team Leader with a summary DOE assets checklist which provides a description of available DOE resources, their capability, and location. This listing should be compiled and formatted in such a way to be easily readable and useable for management purposes and provide space adjacent each resource item where notations could be made. The ARG Team Leader should have numerous copies available for dissemination in the field. A copy would be provided to the OSC, who would then also have a ready reference to DOE assets. Provide individual fly-away kits to ARG members based on their particular ARG role.

12. PUBLIC AFFAIRS

a. Topic: Public Affairs Exercise Play - Artificialities

(1) DISCUSSION: Although Public Affairs Officers (PAO's) worked an eight-hour day during exercise play, NUWAX operations personnel operated on a "24-hour day." The civilian news media also were working "normal days," i.e., eight-hours. Hence, weapons operations which required about 1-1/2 days were played by the media as having taken 3-1/2 days.

It was also observed that the accident simulated the death of eight persons and that four others were asphyxiated.

(2) CONCLUSION: By most indications, exercise public affairs play was not timed on the same basis as other NUWAX play. Another artificiality which detracted from the public affairs portion of the exercise was the failure to pursue the development of information, such as the numbers of persons killed and causes of death, which in real life would have been topics of major concern, and inquiry activity by family and civil community groups.

(3) RECOMMENDATION: Schedule and base all exercise component play on a 24-hour day to avoid confusion and interject a high degree of realism into the exercise. Assure umpires feed public affairs information into the exercise in a timely and realistic manner.

b. Topic: Joint Information Center (JIC) - Operational Effectiveness

(1) DISCUSSION: Media personnel were allowed a limited degree of exposure to information sources through the JIC, which had been established

to provide a single point of coordination and control. The JIC was intentionally located some distance from the operations center of the OSC and other participating organizations. .

(2) CONCLUSION: A higher degree of cooperation could have been achieved between government Public Affairs Officers (PAO's) and the news media. It is felt such cooperation could have been fostered by: conducting more frequent briefings; soliciting and honoring, as practicable, media requests for particular types of information; and by providing greater access to operational personnel through the JIC.

(3) RECOMMENDATION: Through the JIC, the OSC should provide for news briefings twice daily. These briefings should follow the OSC's operations briefings to assure the most up-to-date information. As an element of this recommendation, PAO's should be privy to the OSC's operational briefings to the degree possible. Solicit and respond to requests for specific information from the news media. Schedule periodic briefings by operational personnel, through the JIC, in order to provide topical information, and to minimize the need for duplicative and time-consuming one-on-one interviews.

APPENDIX 1 TO ANNEX D TO JOINT DOD/DOE/FEMA NUWAX-83 AFTER ACTION REPORT
SENIOR SITE RESTORATION UMPIRE AFTER ACTION REPORT AND NUWAX-83 SITE
RESTORATION PLAN

a. Topic: Site Restoration

(1) COMMENT/DISCUSSION: Formation of a task group on D+1 was an important aspect of accomplishing a Site Restoration Plan. An initial meeting was called by FEMA and was attended by members of the Navy, Commonwealth of Virginia, Jefferson County, EPA, HHS, Department of Interior, USDA, Red Cross, and a DOE representative. Information was rapidly deployed at these meetings and those that followed on D+2, on D+3, on D+4, and finally a draft restoration plan on D+5. On D+5, a draft plan agreed to by the Navy, Commonwealth of Virginia, DOE, and FEMA was presented to the task group. Some editorial work was performed on the plan and a final plan formulated by 1200 on D+5. During the course of the exercise the task group requested: (1) a fixant spray which was applied via simulation, (2) characteristics of a contaminated zone, (3) engineering systems support, (4) instrumentation to define the perimeter of the contaminated area. All tasks were accomplished or were in the process of being accomplished. The final recommended course of action was acquisition of the land by the Navy with decontamination by the Navy.

(2) CONCLUSIONS: The following are lessons learned during NUWAX-83 from the viewpoint of the umpires: (1) an early start on the Site Restoration Plan resulted in early surfacing of issues such as cleanup criteria which do not exist as a regulation or in an officially adopted form, (2) damage assessment in terms of damage and cost estimation is needed

for this type of incident. This came about because current damage assessments are currently developed only for catastrophic events such as storms, earthquakes or other natural disasters.

The responsibility of a Site Restoration Plan by a very large multi-agency task group should be divided up early. The task group operated at NUWAX-83 with all parties present and little formalization of working subgroups. To accomplish the task, the Navy, Commonwealth of Virginia, FEMA, and DOE did form an ad hoc subgroup to prepare draft documents. However, this probably should be decided early, and become part of the record in the event of a real incident. The players representing all agencies provided positive input without compromising the interest of the agencies. The final plan resulting from the activities of the task force would likely protect the health of the people and the environment.

(3) RECOMMENDATION: Although cleanup criteria for such an incident and simulated for NUWAX-83 are likely to be a negotiated number, the Federal agencies and State agencies and local government involved, need some type of official standard or criteria base that can be pointed to as being a no-harm level or minimal harm level for radioactive contamination. The authority to set such a standard resides with the Environmental Protection Agency. Such a standard ought to be developed for nuclear weapon accidents cleanup.

PORT GASTON VIRGINIA SITE RESTORATION PLAN

PURPOSE:

To address the problems associated with the radiological contamination resulting from the U.S. Navy CH-46 helicopter crash at the Port Gaston Naval

Ordnance Facility on May 5, 1983 and the ensuing detonation of the high explosive of a nuclear weapon being carried by that helicopter.

To propose actions for permanently resolving these problems.

SCOPE OF PLAN:

This plan addresses all land and facilities which have received radioactive contamination in the areas of Port Gaston, Virginia, as a result of the crash on May 5, 1983. This plan includes Criteria for Certification of Cleanup according to radiological standards identified during the planning process. This plan addresses actions required to clean up or otherwise prevent health hazards to the citizens of Port Gaston, Virginia. These actions include measures brought to bear due to the contamination of the air, soil, water, vegetation, livestock and other animal life, buildings, food production facilities, etc.

This plan addresses the funding of the actions to be taken under this plan. This plan includes provisions for the long-term monitoring of the air, soil, water, and locally produced foods and supervised by the U.S. Environmental Protection Agency.

Actions under this plan requires compliance with the National Environmental Policy Act (NEPA).

This plan does not address the resolution of any legal claims from citizens of Port Gaston for personal injury or financial losses, etc.

CURRENT STATUS:

All individuals whose death was caused by the crash on May 5, 1983, were identified and removed from the site as quickly as possible consistent with the safety of emergency response personnel.

All weapons and other classified material have been removed.

The National Defense Area, established by the Navy On-Scene Commander at the time of the crash and as subsequently expanded, has been dissolved and control of this area has been returned to State and local authorities.

Plots of the contaminated area have been identified. More sensitive instruments, which require more time-consuming methods, will be employed to more precisely define this boundary.

A monitoring program has been initiated. Air, water and soil sampling has been initiated and will continue to be used to safeguard the health and safety of workers during the recovery program as well as present and future occupants.

RESTORATION ACTIONS:

1. Decontamination will be accomplished in two phases. Phase one, initial decontamination, which will encompass approximately 33 acres and 100 buildings, will involve decontamination of all areas which have radiation readings of 20 microcuries per square meter or higher. Decontamination actions include: (1) construction of earth dams at the confluence of surface drainage features to create settlement basins; (b) removal of topsoil and surface vegetation to a depth of about six inches, or to a greater depth if required to achieve radiation reading less than 20 microcuries per square meter. The estimated quantity of soil is 28,000 cubic yards; (c) remove and shred all vegetation; (d) scrub and wet vacuum all paved surfaces; (e) wash exterior walls of all buildings; (f) decontaminate and remove all personal property with a value greater than \$300.00 which can be decontaminated.

Archaeological and historical objects will be decontaminated with assistance of an archaeologist; and (g) fix materials on roofs. Displaced citizens will be requested to provide an inventory of household items meeting the above criteria. This will include items such as cars, boats, and television sets. Personal items of great sentimental value will be considered on a case by case basis. It should be noted that the extent of contamination inside buildings is not known at this time, and the level of contamination may determine which items may be retrieved.

2. The Department of Energy is taking the lead in locating an appropriate disposal/long range storage site, and is arranging for utilization of that site. DOE will provide transportation. Identification of a disposal site will be made by May 17, 1983.

3. Under Phase two, remedial actions will be performed to assure that maximum doses to area occupants as a result of exposure to Plutonium 239 will not exceed 1 mrad/year to the lung and 3 mrad/year to the bone of any individual. Alternative remedial actions to be performed under Phase two will be evaluated in the NEPA process, and the selection options will be announced in a Record of Decision.

4. An alternative to decontamination of individual houses would be acquisition by the Navy of the entire area to be decontaminated and all structures thereon. This option could involve demolition of all buildings to an approved storage area rather than attempting to decontaminate them. The weather and wind conditions at the time of the accident have probably resulted in extensive contamination within many buildings. The extensive

survey of all interior surfaces, objects and subsequent decontamination would be very expensive.

5. A detailed comparison of the relative costs of the above alternatives is beyond the capabilities of the site restoration planners at this time.

Purchase of the property by the Navy for uses other than residential, i.e. less than full time habitation, would reduce the requirement for long-term monitoring and preclude the potential for future claims against the government. This course of action may therefore be attractive.

6. The Navy will prepare an Environmental Assessment in accordance with the National Environmental Protection Act for submission and review by all concerned.

7. The Navy will coordinate action with the Council on Environmental Quality to obtain authorization to proceed with the initial decontamination phase prior to filing of an Environmental Assessment.

8. The recommendations contained in this plan will be reviewed by higher authorities in all concerned agencies.

9. The review process will provide for public input as prescribed by State Law.

ANNEX E TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT
FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) AFTER ACTION REPORT LESSONS
LEARNED

1. This annex contains comments submitted by the Federal Emergency Management Agency (FEMA) on NUWAX-83.

2. COMMAND AND CONTROL:

a. Topic: Location of the Federal Response Center and the On-Scene Commander's Command Post

(1) COMMENT/DISCUSSION: The Senior FEMA Official, the Commonwealth of Virginia and the civilian Federal agencies were collocated at the exercise site. The On-Scene Commander (OSC) maintained his command post at his "normal operating location" at the Port Gaston Naval Ordnance Facility. The fact that the major response elements were not physically located in the same area proved to be awkward and not conducive to coordination and easy exchange of information.

(2) CONCLUSION: Coordination among all response elements (military and civilian; Federal, State and local) could be improved by collocating their operating centers, or, at a minimum locating in close proximity to each other.

(3) RECOMMENDATION: The NARP, the FEMA Emergency Response Team plans, and the Federal Radiological Emergency Response Plan should each reflect the importance of locating operating centers in the same or nearby locations.

b. Topic: Headquarters Federal Agency Participation in NUWAX-83

(1) COMMENTS/DISCUSSION:

(a) One of the objectives of the exercise was to "expand the senior level involvement in the Washington, D.C. area." However, the exercise activity of officials in Washington, D.C. was limited. Although attempts were made during the planning stages of the exercise to create meaningful exercise play at the Washington level, these efforts apparently were not successfully pursued. Master Scenario Events List (MSEL) items were prepared by FEMA and various other civil Federal agencies during the exercise planning stages. However, many of the MSEL items were not used during the exercise. Other MSEL items used during the exercise apparently were prepared without checking with the appropriate program offices in Federal agencies. This situation led to the use of totally inappropriate MSEL items which served no useful purpose.

(b) Another problem related to the lack of participation at headquarters occurred when an exercise controller left a significant, time-sensitive MSEL item on the Environmental Protection Agency's (EPA) recording equipment and did not follow up to assure that the message was actually received. (The equipment was inoperative and resulted in the appropriate EPA official not receiving the message until the following day.)

(2) CONCLUSION: Efforts of exercise planners and controllers to create meaningful participation by the headquarters officials of Federal agencies were either lacking or were not pursued to their desired conclusion. The exercise design, including the preparation of MSEL items, did not achieve their objective.

(3) RECOMMENDATION: A closer working relationship should be established between exercise planners (including contractors) and program officials in Federal agencies. Exercise planners should assure that meaningful inputs are received from appropriate agency officials and that these inputs are used during the exercise.

c. Topic: Separate Exercise Play on the Site Restoration Plan at Washington, D.C. and On-Scene

(1) COMMENT/DISCUSSION: On D+1, the Senior FEMA Official requested that Federal, State and local officials on-scene begin work on a site restoration plan. On approximately D+2, discussions were also underway at headquarters on a site restoration plan when an exercise message from the President to EPA and to FEMA directed that EPA assume the lead in negotiating cleanup standards and that FEMA identify means to fund the cleanup and restoration efforts. The on-scene players inadvertently learned of this message and were informed by a controller at the scene that the exercise controllers had acted to prevent the message from being relayed from FEMA headquarters to the on-scene players. On-scene players were instructed to disregard this message.

(2) CONCLUSION: The decision by the exercise controllers to prevent this exercise message from being relayed to the on-scene players precluded any interaction between headquarters and the on-scene activities on an important policy question.

(3) RECOMMENDATION: In any future exercise, any MSEL item, once injected into exercise play, should be permitted to flow among all exercise

players as free play. Attempts to maintain separate exercise activity at headquarters and on-scene on the same issue should be avoided.

d. Topic: Exchange of Liaison Officers between the On-Scene Command and the Senior FEMA Official

(1) COMMENTS/DISCUSSION:

(a) As soon as the Senior FEMA Official (SFO) established operations at the accident site, he assigned a FEMA liaison officer to work with the On-Scene Commander (OSC). The FEMA liaison officer was unable to effectively function since he was unable to attend many of the OSC's meetings, did not have full access to the Navy Operations Center, etc. The Navy staff officer assigned to work with the FEMA liaison officer was frequently absent from the Navy Operations Center, further curtailing the ability of the FEMA liaison officer to function effectively.

(b) When the SFO first set up operations at the Federal Response Center, he also requested that the OSC assign a liaison officer to the Federal Response Center. Despite frequent follow-up requests, the OSC did not assign a Navy liaison officer to the Federal Response Center until D+2. This Navy liaison officer was assigned liaison responsibility simultaneously to both the Federal Response Center and the Commonwealth of Virginia operations center.

(2) CONCLUSION: The failure to quickly exchange liaison officers between the OSC and the SFO, plus the absence of a well defined, mutually accepted role for these liaison officers, prevented what could have been an effective means of coordination and information exchange between the Navy operations center and the Federal Response Center.

(3) RECOMMENDATION: The procedures of the On-Scene Commander (NARP) and the SFO (the FEMA Emergency Response Team Plan), and the Federal Radiological Emergency Response Plan should incorporate provisions for exchange of liaison officers. These procedures should define the authorities and responsibilities of the individual assigned this responsibility.

e. Topic: Exercise Termination

(1) COMMENT/DISCUSSION: NUWAX-83 was terminated on Tuesday, May 10, one day before the expected end of the exercise. The accident crash site had been brought under control, the weapons removed, and the national Defense Area returned to State/local control. However, several significant issues were still being actively pursued at the time the exercise was terminated. The development of the Site Restoration Plan and the Commonwealth of Virginia's request for a major disaster declaration under the authority of Public Law 93-288 were two examples.

(2) CONCLUSION: The decision to terminate the exercise appeared to be based totally on the military on-site aspects of the exercise. The termination of the exercise on May 10 prematurely ended meaningful exercise play on issues with longer-term implications and which impact most directly on State and local officials.

(3) RECOMMENDATIONS:

(a) The principal agencies involved in the development of the Site Restoration Plan should be assembled in the near future for the purpose of continuing to resolve differences and to identify issues concerning the Site Restoration Plan.

(b) Any future exercise should place equal emphasis on all issues being worked by all Federal and State agencies, and such issues should be pursued to a meaningful conclusion before the exercise is terminated.

f. Topic: Site Restoration Plan

(1) COMMENT/DISCUSSION: An on-scene team with representatives from several agencies and State and local governments engaged in extensive discussions in an effort to prepare a Site Restoration Plan. A question which lead to considerable discussion and confusion was which Federal agency has the authority/responsibility for speaking for the Federal government regarding the standards of cleanup which will be used in a Site Restoration Plan. The agency that is responsible for the accident and, consequently, will be funding the cleanup? The EPA? The DOE? Although EPA suggested the use of proposed standards drafted by their agency in 1977, all exercise players recognized that these were only one agency's proposals. Furthermore, even if there had been approved Federal standards, there were no assurances that State and local officials would have accepted these standards.

(2) CONCLUSION: The lack of an approved decision making process by which a Site Restoration Plan can be approved (who/which Federal department or agency has the authority to make the final decision for the Federal government) would probably result in delays in the development and approval of a Site Restoration Plan.

(3) RECOMMENDATION: FEMA, DOD, DOE, and EPA should jointly develop and agree to procedures which describe the decision making process for developing and reaching agreement at the Federal level on a Site Restoration Plan and for resolving any differences between Federal officials and State/local officials.

g. Topic: Lack of Emphasis on the Public Health and Safety Aspects of a Nuclear Weapon Accident

(1) COMMENT/DISCUSSION: The design of the exercise scenario and the controller injects appeared to place primary emphasis on the technical aspects of the weapons and the weapon recovery operations. The problems of dealing with the civilian populace, including the many aspects of public health and safety, could have been given more emphasis during the exercise. For example, the exercise did not force the players to address the need for identifying and screening a large number of citizens for radiological contamination prior to allowing them to relocate outside the immediate accident scene, for assessing and monitoring the food chain, or for monitoring and assessing the impact of the radiological material contaminating the ground water supply.

(2) CONCLUSION: Many important aspects of the response to a nuclear weapon accident were not adequately tested during NUWAX-83. Many of these aspects are the issues which would become the most significant once the weapons have been secured and which could determine the overall success or failure of the response as judged by the public and the news media.

(3) RECOMMENDATION: Future nuclear weapon accident exercises should be designed to realistically evaluate the Federal/State/local response to the off-site aspects of a nuclear weapon accident. This would include the identification, processing, care and relocation of large numbers of potentially contaminated individuals, and a more thorough consideration of the restoration, legal, and liability issues which were not fully addressed before the exercise was terminated.

h. Topic: Bioassay Analysis Capabilities

(1) COMMENT/DISCUSSION: In the process of evacuating local residents from the accident scene, the need arose for checking for any internal contamination of these residents through a process of bioassay analysis of samples. Depending on the scope of the contamination and the location of an accident, the need for bioassay analysis capabilities could be rather extensive, requiring analysis of hundreds of samples in a short period of time. Although no actual analysis occurred during the exercise, the Department of Health and Human Service (HHS) would rely on DOE resources to perform this analysis in an actual accident.

(2) CONCLUSION: Although the HHS would normally rely on DOE for this bioassay analysis, HHS does not have any formal interagency agreement with DOE nor does it have any indication of the extent of DOE's capabilities for analyzing a large number of samples in a short period of time.

(3) RECOMMENDATION: The HHS should formalize an agreement with DOE to provide bioassay analysis. This agreement should specify the location and specific capabilities of various DOE laboratories that could be called upon to assist in such analysis.

1. Topic: Administration of the Joint Information Center (JIC)

(1) COMMENT/DISCUSSION: Public affairs officials from the IRF and the SRF established the JIC and assumed responsibility for the management of the center, the establishment of release procedures, establishment of ground rules for conducting news conferences, etc. Responsibility for these functions was not transferred to FEMA until D+4. This transfer was in accordance with existing procedures which indicate that it will be transferred when a mutual agreement is reached between the ASD(PA) and the Director of FEMA's Office of Public Affairs. The performance of these functions by Navy personnel during the first 5 days of the exercise detracted from their responsibilities for collecting and disseminating information regarding the accident which needed to be provided to the media and the public.

(2) CONCLUSION: The transfer of responsibility for the administration of the JIC should be accomplished as soon as FEMA is prepared to accept it. Transfer of this responsibility from the IRF/SRF as soon as possible would free them to gather and coordinate specific information regarding their activities during a very critical time. The transfer of the administrative functions would not compromise the IRF/SRF's ability to control the release of information regarding their activities.

(3) RECOMMENDATION: DOD and FEMA interagency agreements and internal procedures should be revised to provide for transfer of the administrative functions of the JIC from DOD to FEMA when FEMA is on-scene and prepared to assume this responsibility.

j. Topic: Management of the Joint Information Center (JIC)

(1) COMMENT/DISCUSSION: The management of the JIC, including the scheduling of news media conferences, briefings, and question and answer sessions, during the early days of the exercise did not result in meeting the need for official information on a timely basis. Some principal officials including the OSC were reluctant to appear at these daily press conferences unless significant new material was to be presented. Ground rules for the conducting of the news conferences were not established, thereby resulting in conferences that were out of control, with some news media personnel totally disrupting the conferences with screaming and yelling their questions. The briefing officials from the Federal agencies were unable to control the situation.

(2) CONCLUSION: The public information effort during the early days of the exercise was not properly organized and managed. The JIC did not effectively respond to the need for immediate emergency public information. Key Federal officials did not recognize the importance of their appearing at press conferences and providing any available information to the public and the media. The absence of generally accepted procedures for public affairs activities led to disruptive, unorganized news media conferences.

(3) RECOMMENDATION: Standard operating procedures for the JIC should be developed jointly by DOD, DOE, and FEMA and provided at the time of an accident to all officials operating the center. These detailed procedures should include considerations for security, media accreditation,

ground rules for news conferences, scheduling, requests for interviews, printed release numbering system, news release letterhead, etc. These procedures should also stress the importance of having senior officials meet with the news media on a regular basis. These procedures should be developed in manual form and include checklists of needed supplies for operation of the JIC.

k. Topic: Location of the Joint Information Center (JIC)

(1) COMMENT/DISCUSSION: The JIC was established on D-Day a very short distance from the accident site and several miles from the command post of the On-Scene Commander and from the Federal and State operations center. The distance between the JIC and key operations centers hampered efforts of the JIC staff to gather information from the major operations centers. This problem was further exacerbated by a lack of adequate radio communications between the JIC and the operations center. Principal officials of the key agencies were forced to spend valuable time driving to and from the JIC for the news conferences. In addition, the location of the JIC was established very near the contaminated area at a time when the boundaries of the contaminated area were not yet firmly established.

(2) CONCLUSION: The location of the JIC was not optimum for either the convenience or the safety of Federal officials.

(3) RECOMMENDATION: The JIC should be located in close proximity (but not collocated) to the source of information and in an area that is adequately separated from any radiological contamination.

ANNEX F TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT
COMMONWEALTH OF VIRGINIA (COV) AFTER ACTION REPORT LESSONS LEARNED

1. COMMAND AND CONTROL

a. Topic: Interagency Coordination

(1) COMMENT/DISCUSSION: Exchange of liaison personnel with the military was actively pursued by the COV at the Navy Radiological Control (RAD CON) area on 5 & 6 May and at the SRF headquarters on 6 May. COV liaison personnel were not allowed at the Navy RAD CON area until the afternoon of 6 May and at SRF headquarters on 7 May. (Security clearances delayed the liaison at the SRF headquarters). The Navy sent one liaison officer to both COV and FEMA on 7 May; it is our opinion that the military should send a separate liaison officer to each operations center (COV, FEMA), and that the exchange of liaison should be established early after the arrival of SRF at the latest.

(2) CONCLUSION: The exchange of liaison personnel was delayed and was not properly handled throughout. It is necessary that the civil and military organizations have the capability to exchange information concerning current and planned operations on a minute basis and only the presence of liaison personnel within the headquarters of each element i.e., the civil and military, will permit this.

(3) RECOMMENDATION: It is recommended that instructions for the military emphasize exchange of liaison personnel with civil forces early on in the accident response. Consideration must also be given to the security classification matter; there should be a capability for the military to have civil personnel participate in discussion of accident response operations without having to discuss classified information. It is also recommended

that Standing Operating Procedures for civil organizations provide for sending liaison personnel to the Military On-scene Commander at the onset of response to a nuclear weapon accident.

b. Topic: Operating Procedures

(1) COMMENT/DISCUSSION: The COV State EOC operated under normal Standing Operating Procedures. These procedures are used on a daily basis in operation of the Virginia EOC in Richmond. They are dynamic procedures and are changed as the need is determined. The procedures were adequate for the operation of the EOC during NUWAX-83.

(2) CONCLUSION: Current Virginia Emergency Operations Center SOP are adequate for the conduct of Nuclear Weapons Accident Response.

(3) RECOMMENDATION: Continue to change SOP as the need arises.

c. Topic: Command Post Management

(1) COMMENT/DISCUSSION: There were several management decisions made at the Virginia Emergency Operations Center (Virginia Command Post) which should be considered in any state response for nuclear weapons accident. Early in the first day the COV declared a State of Emergency. This action provided for funds for response and permitted the state and local governments to take response procedures without consideration of normal administrative procedures. Shortly after the declaration of State of Emergency the COV EOC activated the Emergency Broadcasting System (FRS) to announce the declaration of State of Emergency and to provide information on response action to the citizens. The EBS was used throughout the exercise

for this particular purpose. This is an excellent tool for state and local governments to provide information to their public and should be used without hesitancy.

On 8 May (D+3) the COV submitted a request to the President for a declaration of a major disaster with limited application - individual and family grant program; temporary housing; Small Business Administration Disaster loan. This was done to help alleviate the immediate problems of the victims of the nuclear weapons accident. It is considered that actions of these types are a must and that the handling of the people problem should be foremost in the thoughts of all concerned in the response, even those who have weapons safety and recovery responsibility. On 11 May (D+6) the COV wrote a letter to the President requesting that he take immediate action to provide Federal funds and services to initiate and complete the restoration of the damaged area and that these funds be 100% Federal funds handled perhaps through the Federal Emergency Management Agency, the Department of Defense, or the Environmental Protection Agency "Superfund." Again, the thought is that the prime consideration is to take care of the people and this should be foremost.

On 6 May COV personnel initiated discussions with the Navy concerning the disestablishment of the National Defense Area (NDA). At this time the COV presented a draft memorandum of agreement on the turnover of the NDA, requesting at least a 24-hour notification of the Navy's desire to disestablish the NDA and an inspection within the NDA at least 12 hours

prior to the actual turnover, by Commonwealth of Virginia personnel. This memorandum of agreement also discussed proposed funding of security personnel to secure the former NDA and any other areas that must be cordoned because of radiological contamination. This latter action more properly should have been left for other documents rather than the initial memorandum for agreement for turnover.

(3) RECOMMENDATION: It is recommended that the actions taken by the Commonwealth of Virginia on the declaration of the state of emergency and request for declaration for major disaster and letters requesting the President to provide funding for restoration be considered as items for inclusion in the NARP both for the Federal Emergency Management Agency to discuss with state and local governments and for local and state governments' consideration. It is also recommended that draft or type memorandums of agreement on the turnover or disestablishment of the National Defense Area be included in the NARP and in procedures for state and local governments. Recognizing that this type memorandum of agreement cannot answer all situations, it is imperative that the military and the civil response forces have a basis on which to initiate discussions for disestablishment of the national defense area long before its actual disestablishment. It is the view of the Commonwealth of Virginia that the establishment of the National Defense Area and the disestablishment of the National Defense Area should be joint cooperative efforts with maximum use of the peculiar authorities that belong to the Federal, military and the state and local governments. It also should be noted that the National Defense Area in NUWAX-83 was

established within a secure area itself, i.e., the Nevada Test Site, and that the establishment of the National Defense Area within the environs of a county or state government might well pose problems that were not noticeable during NUWAX-83. Therefore, it is essential that procedures and type memorandum of agreements for turnover be discussed in the NARP and in state and local governments' emergency operations procedures to insure the smoothest operation of the NDA and its final disestablishment.

4. RADIOLOGICAL SAFETY AND CONTROL

a. Topic: Interagency Coordination

(1) COMMENT/DISCUSSION: The Commonwealth of Virginia responds to a nuclear weapons accident as to a hazardous materials incident. The Standing Operating Procedures call for local monitoring teams, state monitoring team, and Radiological Health personnel to be consolidated into one organization once the state personnel are in the forward area. The state SOP for Nuclear Accident Response was followed in NUWAX-83; it appeared to be adequate for state response to a nuclear weapons accident. However, there were problems that arose that need to be looked into more closely and better solutions provided. Some of these problems may be attributed to exercise artificialities and the number of personnel available to provide monitoring and other tasks.

There was a considerable amount of confusion in the state Radiological Control area on the first day. Some of this was caused by inexperience of individuals in assigned tasks; however, much of it was due to poor coordination and direction of the joint effort required by the state and

local governments. At the end of the first day there was a review of the problems within the radiological monitoring area and reorientation of tasks. Starting on the second day the radiological monitoring efforts went more smoothly; however, there were still difficulties - some of these arose from use of radiological team chief personnel in the Emergency Operations Center of the local government rather than on the Hot-Line area where strong supervision was needed.

Both the state and local governments lack sufficient radiological detection instrumentation to respond to a nuclear weapons accident properly. The augmentation of the state and local governments by Federal Department of Energy special teams and military radiological special team is imperative early in the response to insure that an adequate grip is obtained on the extent of the radiological contamination. The DOE, RAP, the AFRAT, and the Army RADCON Team assisted the state and were assimilated into the overall effort easily and to great advantage. Without the expanded knowledge and better instrumentation of the Federal special teams the state could not have handled the identification of the area for radiological control or much else in the radiological field.

There were comments made by the Foreign observers concerning the establishment of only one Hot-Line in the operational area. From the state view only one did not appear to be feasible. The military has the responsibility of locating and securing classified material within the NDA and the civil government has the responsibility of establishing the extent of radiological contamination outside of the NDA. These responsibilities

appear to be mutually exclusive and the use of two Hot-Lines, i.e., one for the military in the NDA area and one for the civil forces outside the NDA area appears to be appropriate.

(2) CONCLUSION: It is necessary that state and local governments be provided assistance from the Federal special teams at the earliest moment possible and these teams along with the state and local efforts be combined into one overall effort with each portion of the overall effort doing that which it is best capable of doing.

(3) RECOMMENDATION: It is recommended that the NARP and state Standing Operating Procedures emphasize the need for use of Federal special teams in the radiological effort and that checklists include procedures for obtaining this assistance and for integrating it into the overall effort in the early part of the response.

b. Interagency Support

(1) COMMENT/DISCUSSION: Support provided the Commonwealth of Virginia by Federal special teams to include military teams was more than adequate. Without this assistance the Commonwealth of Virginia could not have carried on the radiological monitoring effort. Another item that was of great value in the radiological effort was the aerial data isopleth survey provided by the aerial monitoring system team. This data along with the use of the FIDLERs of the DOE and military teams were probably the most beneficial radiological resources and data available to the Commonwealth throughout the exercise.

(2) CONCLUSION: Consideration should be given to providing a source of anti-contamination clothing and equipment such as plastic bags for the operation of a hot-line on a consolidated basis, i.e., civil and military, at the start of the response to a nuclear weapons accident. Funding should not be a factor that would prevent joint use of a facility that would have the capability to provide the necessary expendables and "anti-c" clothing needed during the radiological operations of the accident response. The primary factors should be the smooth operation of the radiological effort and providing quick and valid information concerning the radiological situation.

(3) RECOMMENDATION: That provisions be made to provide as a part of the SRF response a facility to provide expendables to include anti-c clothing for the operation of both the military and the civil radiological effort.

c. Topic: Radiological Emergency Medical Procedures

(1) COMMENT/DISCUSSION: Radiological Emergency Medical play was limited because of the number of players available to the state and local government. The effort to bioassay individuals believed to have been exposed to radiation was greatly enhanced by the assistance of representatives from Public Health Service, Center for Disease Control, and Oak Ridge National Laboratory REACT. A preliminary bioassay plan for civilians in the contaminated area was developed by state medical personnel in conjunction with these Federal agencies. The plan appeared to be an excellent basis for a continuing bioassay program and appeared to have been a workable plan. Procedures for developing the bioassay program are not

part of the state Standing Operating Procedures for response to a nuclear weapons accident.

(2) CONCLUSION: There is a need to include in the state SOP Nuclear Weapons Accidents Response procedures for developing bioassay programs for personnel believed to have been exposed to radiation. The assistance of Federal agencies with proficiency in this area is required and should be expected to be used.

(3) RECOMMENDATION: It is recommended that state SOP include procedures for determining the necessity of and developing a bioassay program for personnel believed to have been exposed to radiation and that the SOP include the use of the Federal agencies to provide assistance in developing this program.

5. COMMUNICATIONS

Topic: Equipment/Systems

(1) COMMENT/DISCUSSION: Communications used by the Commonwealth of Virginia during NUWAX-83 paralleled those normally used in Virginia in emergency response. The radio communications were the same frequencies and nets as used in normal Commonwealth of Virginia Emergency Response and the telephone system in the EOC was similar to that in the state EOC at Richmond. Communications were excellent throughout the exercise.

(2) CONCLUSION: Communications normally used in response for emergencies in Virginia are adequate to provide for response to a nuclear weapons accident.

(3) RECOMMENDATION: Change and upgrade communications as needed.

6. Security

Topic: Procedures

(1) COMMENT/DISCUSSION: The security requirement for the COV element during NUWAX-83 was to cordon off those areas determined to have been affected by radioactive contamination and after disestablishment of the NDA to provide a security cordon around this area. Within the limits of exercise play these requirements were met. Had NUWAX-83 been an actual response conducted within the Commonwealth boundaries, physical presence of Commonwealth and local governments security forces would have been sufficient to provide the security required of the state and its local government.

(2) CONCLUSION: Exercise constraints did not provide an adequate testing of security for Commonwealth and local governments forces. However, based on past experience it is believed that the state and local governments could provide required security in case of a nuclear weapons accident.

(3) RECOMMENDATION: No recommendations are made in this area.

7. CASUALTY HANDLING/MEDICAL

Topic: Emergency Medical Services

(1) COMMENT/DISCUSSION: The local emergency medical services system operated effectively but was handicapped by the almost inoperable ambulance provided for exercise play. This ambulance became a problem because the local medical personnel responded to some real emergencies during the exercise. The hospital was almost entirely simulated throughout the exercise.

(2) CONCLUSION: The emergency medical system operated effectively and neither the EMS system nor the hospital was over taxed or unusually stressed by the scenario due to the low number of casualties and the fact none of the injured taken to the hospital were contaminated.

(2) RECOMMENDATION: Increase the stress on the EMS system and hospital in future exercises in order to better test the system and incorporate more realistic involvement at the hospital. Provide ambulance that is safe to operate and that is better equipped so that exercise personnel who are trained EMT's may be used effectively in both exercises and real emergencies.

b. Handling Civilian Fatalities

(1) COMMENT/DISCUSSION: The scenario included six civilian fatalities. All fatalities were located within the National Defense Area and as a result inaccessible to local and state authorities. Confirmation of the number of fatalities, identification of the fatalities, removal from the National Defense Area and release of the bodies to local authorities were slow. Communication between the Navy and local and state authorities regarding the fatalities was limited. Identification of civil fatalities could have been accomplished in a more timely fashion if the Navy had coordinated this effort with the State Police and other local and state authorities. In an actual situation it is believed that the families involved and the press would have exerted considerable pressure on military and state and local authorities to provide information concerning the fatalities more quickly.

(2) CONCLUSION: The turning over of the fatalities that were located in the National Defense Area and the identification of the fatalities were slower than would have been permitted in an actual situation. In both exercise play and actual situation efforts must be made to provide information on civilian casualties and fatalities quickly.

(3) RECOMMENDATION: It is recommended that the NARP include instructions for the military to coordinate closely with civilian authorities to identify civilian casualties and fatalities in a timely manner.

8. PUBLIC AFFAIRS

Topic: Interagency Coordination

(1) COMMENT/DISCUSSION: The COV participated in activities at the Joint Information Center. In general, Joint Information Center activities were satisfactory; however, initially, it appeared that the word "joint" meant the military and FEMA and did not include state information personnel. In information activities, as in most areas, the partners in the activities are state/local, Federal agencies and the military. As soon as this is realized and implemented, the quicker good and pertinent information will be disseminated to the public. In this area as in others mentioned before, the location of the exercise, that is, the Nevada Test Site, added a connotation that would not be so in real life situations. In an actual situation the Joint Information Center would most likely be in an area that would be more accessible to the media and to the public and would not be under direct control of the military. This also adds to the necessity of insuring that the Joint

Information Center concept includes local/state officials as well as Federal military and civil officials.

(2) CONCLUSION: The Joint Information Center must be a state/local, Federal military, and Federal civil facility with each of the participants providing information on that topic of which it has cognizance, that is, the state and local speaking for the activities in the state and local area, the Federal military in the military area, and Federal civil in those activities that pertain to the Federal civilian agencies only. In addition, each public release should be cleared with each participant prior to being released.

(3) RECOMMENDATION: Recommend that the NARP reemphasize the need for joint, that is, Federal civil, Federal military, and state/local Public Information personnel to operate within the Joint Information Center to provide coordinated information.

9. LOGISTICS AND SERVICE SUPPORT

(1) COMMENT/DISCUSSION: Logistics and Service Support for the Commonwealth of Virginia element was satisfactory in all areas. However, problems arose during the planning in implementation of logistics directives in that initially the Commonwealth of Virginia was not considered a separate planning element within the NUWAX structure. Should states participate in future NUWAX exercises, they must be considered separate planning elements at the onset of the planning cycle.

(2) CONCLUSION: Logistics and service support was satisfactory. State elements participating in Nuclear Accident Weapons Exercises should be

handled as separate planning elements at the beginning of the planning cycle.

(3) RECOMMENDATION Include instructions in exercise directives to provide for the participation of state element in logistics and service support planning at the start.

10. Topic: LEGAL AFFAIRS

(1) COMMENT/DISCUSSION: The Commonwealth of Virginia had a representative from the Office of the Attorney General who served as counsel for both state and local governments during NUWAX-83. The goal of this representative was to advise governmental units as to the legal implications of contemplated action and respond to specific problems encountered by field personnel. Most of the problems during the emergency were handled by agency personnel using their best judgment. Emergency efforts were not significantly slowed by consultation with the Attorney General representative. Many of the other problems which arose in the local field were predictable ones and as a result relatively rapid answers were available even with the limited library at the ECC. Nevertheless, legal play during the exercise was such that the Commonwealth of Virginia element could not have operated properly without a representative of the Office of Attorney General on-site. It appears though the primary need for use of legal advice would occur during the site restoration period and not during the emergency period. This statement is made based on the fact that the Commonwealth of Virginia decided not to challenge the National Defense Area established by the military but chose to accept it and to approach its dis-establishment in a cooperative effort.

(2) CONCLUSION: In future NUWAX exercises the state element should have representation from its Attorney General's office or equivalent.

(3) RECOMMENDATION: No recommendations are made in this area.

Topic: SITE RESTORATION

(1) COMMENTS/DISCUSSION: The Commonwealth of Virginia Nuclear Weapons Accident Response SOP discusses site restoration. The site restoration plan outline developed during the exercise was in general agreement with COV procedures. It is recognized by COV that a site restoration plan is dynamic and is dictated by the particular incident. As a general observation however, the site restoration plan and funding and actions to implement the plan promptly are the most important aspects of the Nuclear Weapons Accident Response after the immediate emergency actions for victims in the affected area have been completed.

There are several matters that should be included in the site restoration plan. These we believe are the more important:

1. Method of assessing damage. It is a recommendation of the Commonwealth of Virginia that the Federal Emergency Management Disaster Handbooks be used as guides to set up damage assessment teams. Under this system there is a Federal representative, civil and/or military, a state representative, and a local representative on each team, and the team determines and agrees upon the extent of damage and extent of restoration.

2. The standards of decontamination. Whether the level of clean-up is that recommended by the Environmental Protection Agency, that is, 0.2 microcuries per meter squared versus the more commonly recognized standard

of being able to measure satisfactorily in the field of 0.6 microcuries per meter squared really does not seem to be germane. The standard for decontamination more than likely will be forced by public opinion and the political climate at the time and may well be stated publicly as even being lower than 0.2 microcuries per meter squared. Practically though, the standards must be based on dose limits and background readings of the water and soil.

3. The protection of the environment during the clean-up. As the contamination is being removed, procedures must be such that additional areas are not contaminated and the method of protecting the environment (water and surrounding area) must be decided prior to clean-up being started.

The site restoration plan is not a federal edict situation. Practically, once the plan has been developed and agreed upon by Federal, state and local authorities then it should go before the public in public hearings. In this particular arena emotions may have a greater force than considered, well-thought-out procedures and actions.

(3) CONCLUSION: The site restoration should be based on coordinated assessment of damages and agreed upon methods of clean-up and restoration. The plan must be put to public in public hearings, and the developers of the plan, both civil and military, must be prepared to accept more stringent levels of clean-up than those recommended based on the public opinion at the time of the hearings.

(3) RECOMMENDATION: It is recommended that FEMA Disaster Handbooks be considered as guides in assessing and surveying damage after a nuclear weapons accident. It is also recommended that the NARP include instructions on the effect of public opinion and the necessity of having public hearings on the general site restoration plan prior to implementation.

ANNEX G TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT
CHRONOLOGY OF EVENTS

D-DAY (5 May 1983)

Times are local.

0851 (JTG Ops) Exercise starts.

0851 (JTG Ops) Helicopter pilot issues "May Day." Helicopter crashes and is on fire.

0858 (NAVY) NOF Port Gaston notified of helicopter "May Day."

0900 (JTG Ops) W55 WHS (SUBROC) lands in main wreckage, 2 W B-57 bombs land on fence line and 1 W B-57 undergoes a high order detonation.

0902 (NAVY) Large explosion reported by NOF Port Gaston.

0903 (COV) Jefferson County Emergency Resources dispatched.

0905 (JTG Ops) Town onlookers arrive on-site. 5 news media personnel arrive at accident site.

0905 (NAVY) NOF Port Gaston reports BROKEN ARROW. COV informed.

0913 (JTG Ops) Helicopter fire under control.

0930 (JTG Ops) Fire burns itself out.

0930 (COV) Jefferson County declares local emergency.

0932 (JTG Ops) IRF contingency on scene.

0938 (JTG Ops) Helicopter tail number discrepancy identified (exercise artificiality).

0938 (JTG Ops) COV transporting injured to hospital.

0942 (JTG Ops) COV on scene and assumes control.

0943 (JTG Ops) Navy has barricaded Port Gaston Road.

0947 (COV) Local citizens notified of Emergency Broadcast System activation.

0950 (NAVY) NMCC initiates emergency action conference call.

0952 (JTG Ops) 5 contaminated civilians being inspected.

1001 (JTG Ops) COV Fire Chief recommends people stay indoors.
 1002 (DOE ARG) DOD JNACC notifies DOE JNACC.
 1005 (COV) COV notifies FEMA, Region III and requests help.
 1021 (JTG Ops) Navy EOD arrives at accident area.
 1027 (JTG Ops) COV notified (OEES). COV declares "state of emergency."
 1037 (JTG Ops) Governor of Virginia declares accident site a disaster area.
 1039 (DOE ARG) DOD JNACC notifies DOD/HQ EOC of DOE/AL offer to form ARG and provide ARG Team Leader.
 1045 (JTG Ops) Removal of 4 contaminated personnel.
 1051 (JTG Ops) COV OEES arrives.
 1054 (DOE ARG) JNACC transmits ARAC to COV.
 1109 (JTG Ops) EOD locates 1 weapon.
 1121 (JTG Ops) Port Gaston evacuated.
 1130 (CDCE) JNACC notifies CDCE of a potential BROKEN ARROW.
 1138 (JTG Ops) FAA authorizes temporary airspace restriction.
 1149 (COV) Evacuation of Port Gaston ordered.
 1150 (JTG Ops) EOD locates 2d weapon.
 1153 (JTG Ops) Fence workers decontaminated and transported to hospital.
 1206 (JTG Ops) EOD leaving the immediate helicopter accident area and continuing search.
 1213 (JTG Ops) 3 injured are being treated at the hospital.
 1220 (NAVY) SPF arrives NOF Port Gaston.
 1233 (JTG Ops) All casualties clear of area.
 1241 (JTG Ops) Contaminated samples found in town reservoir.
 1253 (JTG Ops) FEMA FRT deployed.
 1259 (JTG Ops) 3 more bodies removed to USN Hosp for ID.

1300 (JTG Ops) Legality of NDA questioned by press.

1302 (JTG Ops) CNO requesting following teams: ATRAP, ARG, FBI, NEST and AMS. (Also requested JACKPOT stand by.)

1304 (JTG Ops) Evacuation of Jefferson County building.

1317 (JTG Ops) EOD Team leave decontaminated area.

1324 (JTG Ops) Widow of casualty demands husband's contaminated body be released.

1333 (JTG Ops) Additional security forces arrive and National Defense Area signs delivered.

1339 (JTG Ops) COV Team finds 4 boxes and returns for instructions.

1350 (JTG Ops) Air sampler readings reported, MSEL 73A injected.

1356 (JTG Ops) COV sets up EOC in Best Western Motel.

1400 (JTG Ops) NDA established and players sign up.

1404 (JTG Ops) Admiral Frick reports in at Navy Ops Cntr. SRF EOD team arrives.

1411 (JTG Ops) EOD Team #2 has arrived.

1420 (JTG Ops) Looter caught in evacuated area.

1422 (JTG Ops) NDA expanded to include Jefferson County building.

1430 (NAVY) SRF Commander takes helicopter tour of accident site.

1441 (JTG Ops) Local civilian refuses medical examination to determine contamination.

1453 (JTG Ops) Industrial and RV Park evacuated.

1530 (DOE ARG) ARG arrives Desert Rock, NV.

1555 (NAVY) Admiral Frick assumes command.

1555 (DOE ARG) ARG Team Leader coordinates with OSC.

1600 (NAVY) JJC established.

1615 (DOE ARG) ARG briefed on accident status.

1622 (JTG Ops) COV requested to move hot line back to original location by Chief Umpire.

1626 (JTG Ops) COV recalls 2 survey teams back to RCL.

1635 (CDCE) C-130 departs Kelly AFB.

1642 (JTG Ops) Removal of classified papers to Hot Line.

1646 (JTG Ops) Line #87 upright, cover being removed for inspection.

1648 (JTG Ops) PANTEX Team arrives and enters area.

1650 (JTG Ops) RAP arrives at 1531.

1651 (JTG Ops) COV moves hot line back.

1700 (JTG Ops) 2 individuals observed watching activity with binoculars.

1725 (JTG Ops) Body of fence worker turned over to COV.

1730 (JTG Ops) Body #7 being transported to USN Hosp.

1731 (JTG Ops) 5-Ton crane requested by Navy for tomorrow by 0815.

1735 (JTG Ops) EOD establishes exclusion area around weapons.

1738 (JTG Ops) 7th body identified, 4 bodies from trailer (2 male 2 female) not identified.

1739 (DOE ARG) ARG briefed by Navy EOD.

1755 (JTG Ops) Line 87 is secured and team leaving area.

2000 (DOE ARG) ARG meeting with Navy EOD (follow-up).

2020 (CDCE) Departed Nellis AFB for Mercury, NV.

2030 (DOE ARG) ARG meeting with OSC.

2140 (CDCE) Arrived at Mercury for badging. All personnel badged.

2220 (CDCE) Departed Mercury for NUWAX area.

2330 (CDCE) Arrived at Navy personnel office, NUWAX area.

D+1 (6 May 83)

0700 (CDCE) CDCE reports in.

0745 (DOE ARG) ARG confirms that HOT SPOT, MIMS, and LANL radiographic equipment have arrived at Port Gaston.

0759 (JTG Ops) DOD ARG Response Team arrives Hot Line.

0850 (JTG Ops) Security NDA and Barrier established at 0846.

0850 (JTG OPS) Medical Bioassay established.

0850 (JTG OPS) DOE HOT SPOT Lab arrived on station at 0849.

0859 (JTG Ops) 3 Navy EOD and 5 DOE ARG arrived on scene.

0900 (NAVY) ARG/OSTD convenes organizational meeting of all radiological assets. JRCC established.

0915 (CDCE) Meeting on current radiological conditions at the accident site.

0926 (JTG Ops) JIC queried about contaminated seafood.

0926 (JTG Ops) Media requests interview with home town sailor.

0930 (DOE ARG) AMS data received and distributed.

0942 (JTG OPS) FEMA Site Restoration Meeting planned.

1000 (JTG Ops) ARG proceeding to site.

1000 (JTG Ops) Looter caught at accident site.

1000 (JTG OPS) ADM Frick Inspecting Hot Line

1010 (JTG Ops) 1st body recovered from area.

1012 (JTG Ops) Msg 061430Z Fund augment action request.

1024 (JTG Ops) Water system prop has been injected to COV.

1029 (JTG Ops) RAP Team told COV the necessity of setting up a bioassay team.

1035 (CDCE) CDCE co-located with ATRAP outside the entry control point.

1055 (JTG Ops) Second body removed to CCU.

1105 (JTG Ops) Lawyer initiates action to legally remove NDA and Federal forces.

1113 (JTG Ops) Two bodies moved to USN Hosp for ID - not contaminated.

1146 (JTG Ops) Two bodies identified.

1204 (JTG Ops) Two more bodies were removed - 1 contaminated.

1205 (JTG Ops) Contaminated body is being decontaminated by Navy.

1245 (DOE ARG) Meeting on weapons recovery approaches.

1330 (NAVY) Initial site restoration meeting held.

1432 (JTG Ops) First of 2 campers caught by COV State Police.

1435 (JTG Ops) COV State Police released camper.

1457 (JTG Ops) 7th body arrived USN Hosp, still contaminated, no ID as yet.

1500 (JTG Ops) Both campers retained at decon. No action taken.

1509 (JTG Ops) Campers being processed thru Hot Line.

1547 (JTG Ops) Campers processed and released.

1605 (JTG Ops) COV animal control officer requests help with contaminated animals.

1642 (JTG Ops) Removal of classified papers to Hot Line.

1646 (JTG Ops) Line #87 Upright, cover being removed for inspection.

1648 (JTG Ops) PANTEX Team arrived and entered area.

1700 (NAVY) Meeting by OSC with senior FEMA, COV, and DOE representatives.

1725 (JTG Ops) Body of fence worker turned over to COV.

1730 (JTG Ops) Body #7 being transported to USN Hosp.

1738 (JTG Ops) 7th body, 4 bodies from trailer (2 male 2 female) not identified.

1755 (JTG Ops) Line 87 is secured and team leaving area.

2000 (CDCE) Radiological control group meeting at VA HQ. Senior Navy, COV, FEMA, and DOE representatives attend.

D+2 (7 May 83)

0700 (CDCE) CDCE assigned specific site restoration duties.

0700 (NAVY) OSC staff meeting.

0823 (JTG Ops) 12 bodies have been recovered.

0842 (JTG Ops) NOF documentation requested under Freedom of Information Act.

0900 (NAVY) Site restoration meeting at FEMA HQ.

1051 (JTG Ops) Navy EOD have found a second classified component.

1055 (NAVY) Weapon transportation meeting held.

1106 (JTG Ops) 2 individuals observed watching activity with binoculars.

1114 (JTG Ops) Recap: Three classified components recovered.

1117 (JTG Ops) Injured patient transferred to hospital.

1125 (JTG Ops) Contaminated leg wound measured at 3000 DPM.

1129 (JTG Ops) Two individuals observing activity have been captured.

1141 (JTG Ops) First radiograph completed.

1143 (JTG Ops) Second radiograph completed.

1200 (DOE ARG) DOE SST (simulated) arrives on site.

1218 (JTG Ops) Model #1 identified.

1305 (JTG Ops) USDA requested to evaluate probable contamination of agriculture at accident site.

1350 (NAVY) Army RADCON Team commences area survey.

1400 (NAVY) Render safe of weapons.

1424 (JTG Ops) Army RADCON notified.

1500 (NAVY) Site restoration meeting at FEMA HQ.
1556 (JTG Ops) Individual observed photographing crash site with telephoto lens.
1601 (JTG Ops) PAO updated (no file copy)
1608 (JTG Ops) Water test results bad. Will be injected into play.
1631 (JTG Ops) UPI reports that 15-30 thousand residents have left area.
1700 (DOE ARG) OSC meeting with senior FEMA, DOE, and COV representatives.
1800 (NAVY) Navy conducts meeting on weapons removal.
1900 (NAVY) Community Emergency Action Team established.

D+3 (8 May 83)

0700 (NAVY) OSC staff meeting.
0730 (NAVY) Navy completes fixing contamination.
0736 (JTG Ops) Two 55-gallon drums ordered for radioactive waste.
0918 (JTG Ops) Four EOD in area approaching MOD #1.
0923 (JTG Ops) Four member ARG joined the EOD team.
0925 (COV) Water sample from reservoir forwarded for analysis.
1054 (JTG Ops) Press briefing at 1330.
1130 (JTG Ops) Rad team to area west of bleachers.
1133 (JTG Ops) Army sending more teams into area.
1156 (JTG Ops) Weapon moved to weapons packaging area.
1205 (JTG Ops) Family of dead crewman demands return of body.
1210 (JTG Ops) Weapon placed in weapon container can.
1220 (JTG Ops) Request to keep RADCON Team out of bleachers.
1230 (JTG Ops) First weapon almost completely packaged.

1244 (JTG Ops) COV and ARG team exiting area, another team entering.

1300 (JTG Ops) Press brief was completed.

1324 (JTG Ops) DOE - ARG departing area.

1325 (JTG Ops) Reeco crane operation lifting second weapon.

1342 (JTG Ops) The 4-man Army RACDON is departing the area through the COV Hot Line.

1345 (JTG Ops) Second item transported to PANTEX area and EOD has exited area. Weapon recovery complete.

1430 (NAVY) Meeting held to coordinate NDA reduction.

1512 (JTG Ops) EOD Team found component in trailer.

1518 (JTG Ops) Two items physically loaded on flatbed truck.

1521 (JTG Ops) Weapons specialist offered money for classified information.

1535 (JTG Ops) Call from Washington updating MSEL.

1549 (JTG Ops) Protesters call for complete halt of all weapons movements.

1609 (JTG Ops) Search team has left the area.

D+4 (9 May 83)

0709 (JTG Ops) Logistics: Three 55-gallon radioactive waste cans arrive.

0900 (DOE ARG) Site restoration meeting at FEMA HQ.

0909 (JTG Ops) Reeco personnel entering NDA area.

0930 (JTG Ops) All six classified components have been found.

0930 (NAVY) Weapons moved from Port Gaston. DOE gains custody.

0959 (JTG Ops) Player reporters in bleacher area.

1004 (JTG Ops) Navy security will dissolve NDA.

1020 (NAVY) Army RADCON Team completes area survey.

1027 (JTG Ops) Large number of protesters observed traveling to accident site.

1027 (JTG Ops) COV cleared player press thru Hot Line.
1030 (DOE ARG) All weapons components across Hot Line and packaged.
1045 (JTG Ops) Unauthorized person infiltrates press conference.
1041 (NAVY) Last three components thru Hot Line.
1110 (JTG Ops) Weapons recovery is complete.
1130 (JTG Ops) EOD left area; unauthorized person in press conference.
1133 (JTG Ops) Unauthorized person in custody.
1155 (JTG Ops) Four man RADCON Team departing area.
1237 (DOE ARG) NVO agrees to provide safe haven for shipment pending final resolution.
1300 (CDCE) Determined that 9400 DOT 7A fiberglass lined wooden containers would be needed to transport the contaminated material.
1308 (JTG Ops) Seven man COV team is leaving the area.
1322 (JTG Ops) Public Affairs SITREP.
1332 (DOE ARG) NVO agrees to accept contaminated soil and materials.
1700 (NAVY) NDA dismantled and area turned over to COV.

D+5 (10 May 83)

0900 (CDCE) Site restoration meeting.
0926 (JTG Ops) VA established security access Rt 619.
0947 (JTG Ops) RADCON Team entering area.
1000 (NAVY) Site restoration meeting held.
1047 (JTG Ops) Additional monitoring assets requested.
1300 NUWAX-83 terminated.

ANNEX H TO JOINT DOD/DOE/FEMA NUWAX-83 VOLUME II AFTER ACTION REPORT
MINUTES OF THE FOLLOW-ON NUWAX-83 SITE RESTORATION PLANNING MEETING
CONDUCTED 27-29 SEPTEMBER 1983

1. A follow-on site restoration planning meeting for the Joint DOD/DOE/FEMA Nuclear Weapon Accident Exercise 1983 (NUWAX-83) was conducted at Headquarters, Defense Nuclear Agency (HQDNA), 6801 Telegraph Road, Alexandria, VA 22310 on 27 through 29 September 1983. Field Command, Defense Nuclear Agency (FCDNA) message DTG 121937Z Sep 83 formally announced the meeting. Objectives of the meeting were defined as follows:

a. To identify basic site restoration issues and the necessary steps to resolve them.

b. To further identify expected agency relationships and responsibilities which were not already clearly defined.

c. To assess the value of the DECON Computer Program at an accident site.

2. Major General Tate, Deputy Director for Operations and Administration, Defense Nuclear Agency, opened the meeting with introductory remarks stressing the significance of the various site restoration issues which need to be resolved. He stated that many of the issues could be addressed by the individuals present at the meeting, and that any solutions reached would be helpful if a nuclear weapon accident occurs.

3. LCDR Carl Fesler, FCDNA, presented a briefing on the Nuclear Weapon Accident Radiological Response Seminar which was conducted at FCDNA on 14 and 15 September 1983. LCDR Fesler highlighted the following areas:

a. Identification of data collection requirements to support public health and decontamination efforts.

b. Determination of the "special teams" capabilities to support collection requirements.

c. Development of common procedures to support data collection and processing efforts.

After a short break, LCDR Fesler gave a presentation on the NUWAX-83 scenario and situation to be considered in meeting discussions. Changes made to NUWAX-83 events and physical layout regarding site restoration were noted. The changes were made to simulate additional actions completed and to better represent an urban Virginia environment than was possible at NUWAX. An abbreviated summary of the situation is at Inclosure 1. LCDR Fesler stated that these minutes should provide agencies and organizations a basis for development and coordination of site restoration procedural guidance.

4. The difficulty in making comparisons between the effectiveness and cost of different decontamination and restoration options was identified as a major problem during NUWAX. A computer program developed for the Nuclear Regulatory Commission (NRC) offers a possible solution to this problem. Mr. Jack Tawil, Battelle Pacific Northwest Laboratories (PNL), with the help of his associates, Mr. Rich Adams and Mr. Dennis Strenge, furnished a detailed briefing on the DECON Computer Program which was being modified for application to the NUWAX scenario. The program was originally developed for the NRC, for use in environmental impact statements when projecting off-site consequences of nuclear reactor accidents, and appears adaptable for use in response to a nuclear weapon accident. The DECON briefing included the following information:

a. Background on the work done by PNL for the NRC and the basic factors considered.

b. The objective of the program is to identify the most cost effective methods of achieving decontamination considering single and sequential decontamination methods and operations, time factors, personnel and equipment needed, and material labor and equipment costs.

c. The program utilizes two data bases, a site data base and a reference data base. The site data base requires generation for each specific accident site. Information required is the target decontamination level (maximum contamination levels after decontamination is completed), the levels of contamination before decontamination, the land use (types of surfaces), and property values. The reference data base contains generic data on decontamination procedures by surface type. This includes decontamination operations which can be performed on the surface, the effectiveness of the specific decontamination operation, the estimated cost per square meter to perform the operation, and the estimated square meters per hour which can be decontaminated by the operation.

d. The methods by which the data bases were developed were described. Questions from the floor determined that cost estimates were based on general labor costs for performing similar type work in an uncontaminated environment. It was generally felt labor would receive a premium for working in a contaminated area and the cost estimates which would result from the existing data base would be low.

e. A short briefing was also provided by Mr. Rich Adams on the possible application of a computerized socio-economic analysis to site restoration planning. Such a computer program (MASTER) for use in major disasters has been developed for DOE. Discussion from the floor strongly questioned the use of the socio-economic approach as a primary method for establishing restoration priorities, while at the same time acknowledging that socio-economic factors should be considered.

5. Meeting attendees were divided into five sub-groups to discuss site restoration questions and issues on the second day of the meeting. The sub-group assignments were made to allow the widest possible representation of participating agencies within each group. Day two of the site restoration meeting was dedicated to sub-group discussions and preparation of sub-group presentations on the questions assigned.

6. Day three of the meeting was used to discuss group conclusions on the questions and issues addressed. The following paragraphs are a composite of sub-group presentations and floor discussions during the presentations. The views expressed represent those of meeting attendees and do not necessarily represent the position or view of the Defense Nuclear Agency or any other agency or organization participating in the meeting.

a. Question: What decisions on decontamination need to be made quickly?

(1) Factors and Options Considered/Recommended:

Within the context of the NUWAX-83 scenario as briefed, the area had been previously evacuated, and EOD operations completed. Therefore, the only factors considered were those dealing with decontamination and site restoration. Those decisions which were required quickly within this context were decisions on possible actions to confine the spread of contamination and limit the problem. Possible actions which could be performed immediately after the accident were reduced in the discussions to fixing. Vacuuming of some surfaces such as streets to remove the contamination prior to fixing was suggested, however it was the consensus of attendees that conventional street vacuums did not have adequate filtration systems and would have limited effectiveness in removing contamination while at the same time causing resuspension. Use of fixatives is discussed as a separate question, however it should be noted here that before a decision to use fixatives can be made and implemented, the levels and areas of contamination must be identified.

(2) Command/Decision Authority:

The on-scene commander should be the decision authority for the immediate use of fixatives.

(3) Time factor:

Existing and forecast weather will determine the speed with which a decision on the use of fixatives is required. Radiation surveys will be required to identify areas where use of permanent, or semi-permanent fixatives are appropriate. In general, fixatives should be applied, when appropriate, as soon as possible.

(4) Related Questions and Issues:

Data on the suitability or unsuitability of various commercial vacuum systems for decontamination operations needs to be compiled for ready reference. The data should include large systems such as street vacuums and smaller shop or industrial vacuums which may be used in buildings or on small irregular surfaces. If an unsuitable system is acceptable with modification or use of a nonstandard filter, necessary modifications should be noted.

b. Question: Do you leach contamination into the soil?

(1) Factors and Options Considered/Recommended:

Plutonium leached into the soil remains in a narrow band very near the surface. It does not readily move towards deep water supplies or become incorporated into plants via uptake through the roots. Leaching is a very ineffective system of removing the plutonium hazard and should only be used for short term control of resuspension. Leaching should not be a concern when deciding whether or not to use water for other decontamination operations, although when water is used, care should be exercised to prevent or control runoff. Sprinkling, which uses less water than leaching may also be used as a temporary fixative, but its effectiveness rapidly deteriorates as the water evaporates.

(2) Related Questions and Issues:

Data on leaching and plant uptake should be compiled into a reference handbook for use in supporting discussions with state and local authorities on the use of water in decontamination operations and the effect of residual contamination levels in the soil on water supplies and the food chain.

c. Question/issue: When, how, and what type of fixative should be utilized?

(1) Factors and Options Considered/Recommended:

Since plutonium can be expected to remain close to the surface of the soil, the use of a fixing agent becomes an important issue. Although the current draft EPA guidelines on transuranic materials do not mention the use of a fixing agent, the next draft of this document will address such use. When deciding on a fixative to be used, its availability and effectiveness under varying weather conditions, and the type of surface to be fixed must be considered. The type of surface, size of the area to be fixed, and the equipment available will affect the method of dispersal. When selecting a fixative its effects on subsequent decontamination operations must also be considered. The use of fixatives may reduce or remove respiratory hazards during decontamination operations. If a surface is to be removed and replaced, a fixative can be permanent (nonremovable) and the fixative may reduce the spread of contamination during the removal operation. If a surface is to be left in place and decontaminated, the fixative should not damage the surface and should be temporary or semi-permanent (removable) in order that decontamination can be performed. A commercial dust palliative, COHEREX, was considered the best all purpose fixative for ground surfaces

which should be readily available because of its wide commercial use as a dust palliative. Light vegetable oil and water are usually available and can also be effective in some circumstances. Strippable or normal paint may be appropriate for some surfaces. Road oil or thin layers of asphalt are extremely effective fixatives but have only limited applications.

(3) Decision authority/agency:

The on-scene commander would be responsible for making a recommendation for its use, but State/local approval would be required before permanent or semi-permanent fixing agents could be used on privately owned property. Advice from Health and Human Services (Public Health Department), EPA, U.S. Department of Agriculture, or the U.S. Food and Drug Administration should be obtained if the fixative used could affect the food chain or the environment.

(4) Time Factors:

Use of a fixative on highly contaminated areas ($100\text{uCi}/\text{m}^2$ or greater) is recommended as soon as possible.

(5) Related Questions and Issues:

(a) Available data on fixatives is scattered and in some cases incomplete. A handbook should be compiled from available data and maintained by the DOE ARG, or other organization which would respond to all accidents, provide information on the types of fixatives appropriate for different surfaces, coverage factors required, methods of application, environmental effects, potential effects on subsequent operations, and possible sources. A copy of the handbook should be kept in the JNACC for telephonic reference prior to arrival of the response organization on scene.

(b) The potential impact of any given fixative on subsequent operations was noted several times. It was suggested that a study of the effect of fixatives on subsequent decontamination operations, and on their long term effects on the environment when left in place may be appropriate.

(c) Any ramifications of using a fixative on explosive ordnance disposal procedures were not addressed.

d. Question: Where and how do you obtain the work force to perform decontamination operations?

(1) Factors and Options Considered/Recommended:

The capabilities of local firms should be assessed and Federal resources employed only when necessary. Local companies should be utilized, when feasible, but only qualified and experienced radiation workers should probably be used in areas with high levels of contamination. Public law dealing with Federal and state contracting procedures may apply to decontamination and restoration operations which are contracted.

(2) Command/Decision Authority:

As the responsible Federal agency, DOD, represented by the on-scene

commander, will determine the source of the work force. Recommendations from state and local authorities should be considered.

(3) Related Questions and Issues:

Procedures used in the DOE Remedial Action Program for contracting work forces for decontamination operations should be examined for applicability to accident response.

e. Question: What is the radiation protection program for the work force and who administers it?

(1) Factors and Options Considered/Recommended:

The work force will consist of radiation monitors, craftsmen, and common labor, some of whom may not have previous experience as radiation workers. Response personnel who are normally radiation workers will be in some form of a dosimetry program maintained by their agency or organization. If people or companies are employed who are not in, or do not have, a radiation safety program, a program will have to be established for them. A common data base should be used for all response personnel to permit identification and investigation of any doses which may have been incurred by the work force and to facilitate ordering and restocking sufficient quantities of anti-contamination clothing and other supplies and equipment to support the work force. Interagency cooperation will be required to insure consistency between radiation safety procedures used, and that necessary data is provided to the radiation safety office of each worker's agency. Interagency cooperation should be effected through the establishment of a Joint Radiological Coordination Center (JRCC). The JRCC should insure training is provided for people not previously trained as radiation workers, and should establish a dosimetry and bioassay program for the work force. Computer support will probably be necessary to maintain an effective program. The JRCC must be established as soon as possible. If the Service Response Force (SRF) has a specialized team, it might be desirable to put that team in charge of the JRCC. In the absence of a specialized team within the SRF, or when agreed upon by the OSC, the DOE Off-Site Technical Director should assume the lead role.

(2) Decision/Command Authority:

The Secretary of Defense (SECDEF) has established radiation safety and protection requirements for service and DOD employees as required by law. These requirements will be implemented by the on-scene commander. Other Federal, state, and local government agencies may have their own radiation safety requirements, however, if these requirements are to be used they should meet or exceed DOD requirements.

(3) Time factors:

The agency/organization responsible for JRCC operation should be predesignated and specified in the NARP by position. The first personnel to arrive should establish the JRCC and should carefully note the arrival of all teams and their capability. Entry control, dosimetry and bioassay, and radiation protection procedures should be established and implemented prior to entry of civilian work force personnel, other than for the performance of emergency functions.

(4) Related Questions and Issues:

(a) All radiation survey and dosimetry data should receive centralized processing to insure consistent interpretation of data. Raw data should not be released for use or information prior to evaluation and correlation within the JRCC.

(b) Common calibration sources and procedures should be used for all radiation monitoring equipment to minimize differences in instrument readings.

f. The following discussion addresses the three following questions:

What are public re-entry criteria during the period of decontamination and restoration operations?

Should people be allowed to occupy any area that will subsequently be decontaminated?

Should you allow for re-entry at different contamination levels at different sites, e.g. transit on roadways, or work places vs. residences?

(1) Factors and Options Considered/Recommended:

The question of re-entry criteria can be addressed for two different situations: temporary re-entry to perform emergency functions and permanent resettlement. Regardless of which situation is considered, a method of determining if, or how much, of a radiation dose was received by the individuals will be required. From a health physics point of view, it is feasible to permit persons to re-enter a contaminated area as long as established dose limits are not exceeded. The dose incurred by people entering the area would depend, not only on the level of contamination, but on the exposure time.

(a) Emergency functions which may require re-entry encompass more than the emergency response to the accident itself. Other emergency functions may include the phased shutdown of an industrial plant to prevent damage to equipment which could be caused by an immediate shutdown, operation/maintenance of public utilities which may serve areas outside the contaminated area (e.g. telephone relays or switching units), or care of agricultural animals. People entering to perform emergency functions would be volunteers, and should be provided training in the appropriate radiation safety procedures. Their entry should be governed by the protective guidelines for radiation workers.

(b) Re-entry for permanent settlement may be allowed in areas where the projected cumulative dose received during the period prior to decontamination and in the post decontamination period is below the acceptable dose limits for the general public. When considering re-entry in the case, the possible effect of tracking contamination into areas which would not otherwise require decontamination must be evaluated. Public perceptions of the health risks associated with returning to their homes or workplaces in this case will influence such a decision. State and local authorities can be expected to take a conservative approach, and if such

resettlement is proposed, the importance of explaining the rationale and any risks involved in an understandable manner cannot be over emphasized.

(2) Command/Decision Authority:

Any decision to permit re-entry would be made by State/local officials, probably on a case by case basis. Federal recommendations may or may not influence the decision. The on-scene commander should support re-entry to perform emergency functions and should assist in evaluating the feasibility of re-entry for settlement. EPA, HHS, and USDA are Federal agencies whose view should be considered in such a recommendation or decision.

(3) Time Factors:

Decisions on re-entry to perform emergency functions need to be made immediately. Decisions on re-entry for permanent settlement should not be made until air sampling data has been obtained, contamination levels determined, and the projected dose for all pathways determined.

(4) Related Questions and Issues:

What measures or controls are required for pets, agricultural animals, and wildlife in the contaminated area? There is an existing agreement between the Red Cross and the Society for the Prevention of Cruelty to Animals to shelter pets in a major disaster. However, it was felt the capacity of existing animal shelters, and the need to monitor and decontaminate pets would render this procedure ineffective in a nuclear weapon accident. Care for agricultural animals was addressed under entry for emergency functions. Fish and wildlife authorities may restrict fishing and hunting until monitoring on a random sampling basis can determine that the handling or consumption of wildlife does not present a health risk.

g. Question: What levels of radiological contamination require respiratory protection?

(1) Factors and Options Considered/Recommended:

Surface moisture, whether or not contamination has been fixed, availability of air sampling and ground survey data, and the quality and type of data available are all factors to be considered when determining what levels of contamination require respiratory protection. In general, respiratory protection should not be required at surface contamination levels below 4.5 uCi/m². Guidance as amended in the proposed change to the Nuclear Weapon Accident Response Procedures (NARP) Manual is appropriate for use in the initial response. Later in the response when additional data is available, requirements for respiratory protection should be established by the on-scene commander based on recommendations from the Joint Radiological Control Center (JRCC).

(2) Decision authority/agency:

On-scene commander (OSC) with assistance from JRCC within the area under his authority. Guidance on respiratory protection requirement by civil and

military authorities should be consistent. Any differences should be resolved within the JRCC by health physics personnel from all participating organizations.

(3) Time Factors:

Respiratory protection requirements must be prescribed quickly in the initial response. Priority should be given to the collection of data upon which to base decisions on subsequent requirements for respiratory protection. Initial air sampling data should be available within 2 hours of initiation of data collection efforts.

(4) Related Questions and Issues:

Standardized units should be used for reporting radiological survey results. Microcuries per meter squared ($\mu\text{Ci}/\text{m}^2$), was used in NUWAX-83, and continued use of this unit as the standardized unit of surface measurement is recommended. Units used in NUWAX-83 for air sampling data varied and standardization is required.

h. Question/issue: What should priorities for decontamination and restoration be based on?

(1) Factors and Options Considered/Recommended:

The needs of the community as a whole need to be considered. Priorities should be based on how to best take care of the people. The most economical method to restore the area to normal use should be used. Methods to contain the contamination and prevent further spread of contamination are preferred. Access to the area must be considered when establishing priorities. The level of pedestrian or vehicular traffic by response personnel, or others, through the area may influence procedures used. The effects of topography and weather on the spread of contamination prior to decontamination, and during decontamination operations must be considered when establishing priorities. To assist in establishing priorities, weather forecasts and statistical data providing the probability and projected amounts of rain before decontamination is expected to be completed will be required. To determine the optimum approach to decontamination and restoration, a radiological survey must be completed and the uses of the affected land identified. Fixing should be considered to minimize the spread of contamination until decontamination operations can be performed. Construction of settlement ponds may also help control the spread of contamination by surface water runoff. The application of fixatives or other control measures may limit the possible methods of decontamination which can be used in an area, while at the same time providing flexibility in the scheduling of subsequent operations and reducing the need for respiratory protection.

(2) Command/Decision Authority:

Overall priorities for decontamination will normally be established to meet the requirements of the local community.

(3) Time factor:

Actions to minimize the spread of contamination should begin immediately after initial emergency actions are completed. Decisions should be carefully and fully evaluated to insure initial actions do not adversely affect subsequent actions.

i. Question: Should requirements for respiratory protection and environmental conditions be considered in developing decontamination priorities and schedules?

(1) Factors and Options Considered/Recommended:

The impact on the community if decontamination operations are delayed is the primary consideration. If the contamination can be fixed and decontaminated with little or no respiratory protection required this would be the preferred method. If respiratory protection will be required and cooler weather later in the year would reduce the risk of heat injuries to the work force, it must be determined if any spread of contamination would occur prior to decontamination, and if such delays would adversely affect the community. Early in decontamination and restoration planning projected weather should be considered and those areas where work will require respiratory protection scheduled in a manner to minimize possible heat injuries to the work force without delaying decontamination operations to the extent feasible.

(2) Command/Decision Authority:

The on-scene commander, in coordination with state and local authorities.

(3) Time factor: Scheduling of operations to minimize delays and reduce risk of heat injuries to the work force should be considered when decontamination and restoration planning is initiated.

j. Question/issue: Should the restoration plan address reparations and possible release of nonspecific claims (e.g. possible devaluation in resale value of property placed on the market at an indefinite time in the future)?

(1) Factors and Options Considered/Recommended:

Public perceptions of the effectiveness of decontamination and restoration operations and any remaining health risk will directly influence whether affected property is less desirable and therefore less valuable. Perceptions will also change as a function of time. Claims procedures are established by public law. It was therefore concluded the restoration plan should contain only procedures for filing a claim and no reference should be made in the plan to reparations for nonspecific damages.

(2) Decision authority/agency:

On-scene commander.

(3) Time factor: Claim filing procedures should be established prior to, or during, site restoration plan development.

k. Question: How will the level of residual contamination which does not result in exposures exceeding 1 millirad/year to the lung and 3 millirad/year to the bone be established?

(1) Factors and Options Considered/Recommended:

Proposed EPA guidelines regarding exposure to transuranic material, recently redrafted and submitted to DOD, DOE, and NRC, were used as background for the discussion. DOD and NRC have responded to these proposals in a manner that appears to support EPA proposals. DOE has not yet responded to EPA's proposals. The proposed standards contain the same dose rates as proposed in the above question and as used in NUWAX-83. The proposed guidelines also include a screening factor of 0.2 uCi/m^2 , below which levels no corrective action or evaluation of potential dose is required. The dose which would be received in areas contaminated above the screening level must be assessed and corrective actions initiated when the resulting dose would exceed the prescribed guidelines. The dose received at levels above screening levels will depend on such factors as land use and the amount of time which people actually inhabit the area. In some cases, long term zoning to prevent a change in land use at some later date could be a possible alternative to decontaminating areas of low level contamination. Whether or not different residual contamination levels for different land uses are used to satisfy the dose guidelines, decision makers will have to deal with the issue of justifying to the public the acceptability of any and all cleanup criteria. Technical data that must be considered when evaluating corrective actions required in areas above the screening level will be based on dose pathways with the inhalation pathway being the most significant in a plutonium accident. The maximum amount of residual contamination would be determined by analysis of this technical data through dose modeling procedures. Sub-groups addressing planning and scheduling of restoration operations observed that to perform planning which can be effectively and rapidly implemented, existing standards, whatever they might be, must be used rather than proposed standards as was done in NUWAX-83.

(2) Command/Decision Authority:

The draft Federal Radiological Emergency Response Plan contains the concept of a "Cognizant Federal Agency" (CFA). The CFA would be responsible for the Federal position in negotiating cleanup criteria with State and local authorities. In a DOD nuclear weapon accident, DOD would be the CFA and SECDEF or his representative as designated through the chain of command would be the decision authority. Other agencies that will have an input to the Federal position may include EPA, DOE, HHS, and USDA.

(3) Time Factors:

It will take some time to fully integrate all the technical and political factors, both in intra-Federal and in Federal/state negotiations, to resolve cleanup criteria issues. An environmental impact statement may be required before final cleanup operations are performed.

(4) Related Questions and Issues:

(a) The dose models to be used to determine acceptable residual contamination levels which meet or are below the prescribed dose guidelines need to be identified. Assuming the inhalation pathway is the most significant dose pathway, resuspension factors, ground roughness factors, particle size, and air mass loading for the area will need to be determined and considered.

(b) The net positive benefit of cleaning up to a given level will need to be considered when planning cleanup operations. Although it may be technically possible to cleanup to a level below that necessary to comply with the prescribed standards, the costs (both dollar costs and normal work risks to the lives of the workers) should be weighed against the decrease in long term health risks expected to be realized by cleaning up to lower levels. Data showing these trade-offs was required to obtain funding from Congress for the Eniwetok cleanup. Similar data can be expected to be required to obtain funding following a nuclear weapon accident. This type of analysis also aids in identifying a residual contamination level which is as low as reasonably achievable (ALARA) and has been used by DOE during decontamination operations to reach agreement with the involved communities on acceptable cleanup criteria.

(c) Once a screening or decontamination level has been established, it must be determined how many and what type of samples should be taken and averaged in a specific size grid area to determine the level of contamination in that grid. The number of samples needed may depend upon the intensity of the land use, with the more intensely used land requiring more sampling.

1. Question: Should provisions be made for deploying the DECON computer program to an accident site?

(1) Factors and options considered/recommended:

The concept of the DECON program was considered good, however several reservations concerning its validity, as written, were expressed. It was felt if a program such as DECON were to be employed, it would be most desirable to deploy it to the accident site. Off-site use would create delays which would partially negate its value as a decision making tool, but in view of the time required for decontamination operations, it could still provide useful information. The program was not operational at the meeting and the value of the specific product could not be assessed. Specific reservations concerning the program, as briefed, included:

(a) A feeling the program was trying to do more than was feasible, particularly in the area of converting dose to target decontamination factors.

(b) The validity of cost data based on the cost of similar work in uncontaminated areas was challenged. Premium wages for working in contaminated areas would result in low estimates for the cost of labor intensive decontamination methods. It was also felt the cost data used was too regional and may not reflect national averages.

(c) The lack of cost data for transportation and off-site waste disposal of contaminated waste for decontamination methods requiring the collection and disposal of waste was felt to be a significant deficiency in the data base.

(d) The effectiveness of leaching as a decontamination method was questioned. Additionally it was felt the possible side effects on the eco-system from the use of EDTA to enhance leaching had not been considered.

(2) Time Factors:

If used, the DECON program would not be required during the initial response, but would be needed when restoration planning was initiated.

(3) Related Questions and Issues: It was noted that many decisions or actions which may be made early in the accident response could have significant impact on later decontamination and restoration operations. It was recommended that a detailed study of site restoration and decontamination procedures be performed using system and fault tree analysis to identify operations or procedures and their effects which could help or hinder subsequent operations.

8. LCDR Fesler concluded the follow-on NUWAX-83 site restoration meeting by thanking the participants for their diligent efforts.

FOR THE COMMANDER:

1 Inclosure
as

WALTER C. FESLER
LCDR, USN
Chairman

SITUATION SUMMARY

Affected Portions of Port Gaston

3 Neighborhoods

- lower socio-economic class near business district
- Hillview - middle class
- Cypress Park - upper middle class

14 Businesses

Agriculture

J.D.'s Produce Farm
10 acres corn
3 acre peach orchard
grazing land

Jefferson County/Port Gaston Statistics

	Jefferson County	Port Gaston
Population	37,000	7,000
Income Level	\$12,300	\$12,800
Work Force	12,220	2,312
Unemployment	5% summer 8% off-season	
	611-977	115-187
Welfare Cases	1200-2500	227-472
Rental Housing	\$200-\$450/mo	
Housing Vacancy		
Rate	1.5%	
Hotel Rates	\$18-\$35/day (off-season)	
	\$26-\$53/day (summer commencing 1 Jun)	
Hotel Vacancy		
Rate	20% (off-season)	
Bond Issues	\$5.5 million (matures 85 & 89)	\$1.5 million (matures 95)

Economic Base - Light industries and services in relation to near-by military bases. Summer tourist trade.

Weather - US Weather Service statistical data

Average May rainfall 3.3 inches
Daily probability of measurable rain - 0.32
Assume no rain for 10 days following accident

Inclosure 1

Possible Government Related Claims

- Lost tax revenues
 - Accident related direct costs and social and emergency services.
 - Reimbursement for direct emergency outlays to affected populace
-

Affected Businesses

Gabes Meat Packing Plant
J.D.'s Produce
Stackills Plastic Medical Products
Oceanside Salvage
Tattoo Parlor
Burke's Furnance Filter Co
Seven Seas Investment Bank
Catfish Cabin Cafe and Fish Market
Anchor Away Pawn Shop
Super Market
Sailors Farewell Trailer Park
Hotel
Radio Station

Businesses employ 370 people (16% of town work force)
Annual tax revenues from businesses - \$120,000

Possible Business Related Claims

- Loss of perishable and/or contaminated inventories
 - Loss of sales/business while closed
 - Loss of customer's who don't come back when reopened
 - Reduced property values
-

Affected Residents

265 Families (615 people)

166 from single family homes (2-vacant houses)
27 from Sailors Farewell Trailer Park
58 from Gaston Tower Apartments (2 vacancies)
24 from units with very light or no contamination

Single Family Homes

Location	Number	Median Value
Cypress Park	47	\$140,000
Hillview	70	\$60,000
Business District	51	\$18,000
Total	168	\$12,000,000 (approx)

245 families are now registered with Red Cross.

Some families have been temporarily placed in the approximately 150 units which were vacant throughout Jefferson County. Many more remain in hotels. Trailers requested from FEMA are arriving and being installed to accomodate others presently in hotels.

Evacuees were told they would be in temporary housing for a minimum of 30 days and the demands for more specific information are increasing daily. Many requests have been made for household goods, clothes, and other personal property left behind.

Contaminated Private Vehicles

Cars belonging to families living in the area

No car families -	21	
1 car families -	126	126 cars
2 car families -	107	214 cars
3 car families -	11	33 cars
Total		373 cars

Approx 200 of these were driven out of the area before the accident.

Business employees, customers, and others drove approximately 250 cars into the area before the accident.

Total contaminated vehicles - approx 425

Possible Private Claims

- Lost wages
 - Expenses for displaced persons
 - Reduced property value
 - Replacement of contaminated cars
-

Radiological Response Actions

- Families evacuated shortly after accident
 - Affected personnel monitored and bioassay program established
 - Only monitoring/response personnel have been permitted into contaminated area.
 - Fixatives have not been used. (NUWAX play simulated use)
 - Comprehensive radiological survey performed.
 - Refinement continuing
-

Restoration Actions Identified During NUWAX

- Phase 1 - Decontaminate all areas contaminated above levels of $20\text{uCi}/\text{m}^2$.
- Construction of earth dams at confluences
 - Remove topsoil and vegetation to depth of 6", or greater if required
 - Remove and shred all vegetation
 - Scrub and wet vacuum all paved surfaces
 - Wash exterior walls of all buildings
 - Decontaminate all possible personal property valued at greater than \$300 (levels of contamination in building interiors unknown)
 - Fix materials on roofs, and later replace them.

Phase 2 - Remedial actions will be performed to assure maximum doses as result of exposure to plutonium will not exceed 1 mrad to the lung and 3 mrad/yr to the bone.

Alternative to individual decontamination of buildings would be Federal acquisition of the area and demolition and removal of buildings as part of area decontamination.

Environmental Impact Statement (EIS) is being prepared.

Initial decontamination actions will be initiated prior to filing EIS.

Recommended restoration actions to be reviewed by higher authorities in all agencies.

Review process will provide for public input as prescribed by state law.

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